DOCUMENT RESUME

ED 465 088 CE 083 366

AUTHOR Lewis, Morgan V.

TITLE Needs, Feedback, and the Future: Need Sensing Activities in 2001.

INSTITUTION National Dissemination Center for Career and Technical Education, Columbus, OH.; National Dissemination Center for Career and Technical Education, Columbus, OH.

SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.

PUB DATE 2002-04-00

NOTE 99p.

CONTRACT VO51A990006; V051A990004

PUB TYPE Information Analyses (070) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC04 Plus Postage.

DESCRIPTORS Academic Standards; Accountability; Articulation (Education); Competition; Consortia; Definitions; Educational Environment; Educational Improvement; *Educational Needs; Feedback; Focus Groups; Futures (of Society); Influences; Information Dissemination; Information Needs; Listservs; Literature Reviews; National Surveys; *Needs Assessment; Postsecondary Education; Professional Development; Public Opinion; Secondary Education; Systems Analysis; Teacher Improvement; *Vocational Education

IDENTIFIERS California; *Career and Technical Education; Financial Assets; Maryland; Massachusetts; Oregon; *Savings Accounts; Self Sufficiency

ABSTRACT

A needs sensing project was conducted to identify the general needs of the field of career and technical education (CTE), dissemination activities, and major forces in the environment judged likely to influence education in the foreseeable future. The need sensing took place with networks developed in regions assigned to the five primary partner institutions of the National Centers for Career and Technical Education, the National Centers' advisory council, and key state leaders. Discussions on the CAREERTECH listserv were monitored, and pertinent literature was reviewed. At the secondary level, the main concerns of CTE were the push toward broader programs with higher standards and expectations for academic and technical skills and CTE's image problem, which was attributed to the public's lack of knowledge about current programs. At the postsecondary level, major concerns included accountability, articulation, professional development, and competition. The major recommendation regarding dissemination was to ask associations and organizations involved in CTE to inform their members about CTE-related publications. (Contains 46 references. Appended are a list of states assigned to consortium institutions; summaries of the focus groups with key state occupational education leaders; sample topics discussed on the CAREERTECH listserv; and a list of need sensing participants.) (MN)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 465 088

Needs, Feedback, and The Future:

Need Sensing Activities in 2001

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

CTE
CAREER & TECHNICAL EDUCATION

NATIONAL RESEARCH CENTER
NATIONAL DISSEMINATION CENTER

CE 083 366

This report is based on research conducted by the
National Dissemination Center for Career and Technical Education
The Ohio State University
National Research Center for Career and Technical Education
University of Minnesota

Distribution of this report is by the
National Dissemination Center for Career and Technical Education
The Ohio State University

This report and related information are available at **www.nccte.com.**
Additional printed, bound copies of the report are available from:

National Dissemination Center for Career and Technical Education
Product Sales Office
The Ohio State University
1900 Kenny Road
Columbus, Ohio 43210-1090
800-678-6011 ext. 24277
Fax: 614-688-3258

Needs, Feedback, and the Future: Need Sensing Activities in 2001

Morgan V. Lewis
National Dissemination Center for
Career and Technical Education

National Dissemination Center for Career and Technical Education
The Ohio State University
1900 Kenny Road
Columbus, Ohio 43210-1090

April 2002

Funding Information

Project Title:	National Dissemination Center for Career and Technical Education	National Research Center for Career and Technical Education
Grant Number:	V051A990004	VO51A990006
Grantees:	The Ohio State University National Dissemination Center for Career and Technical Education 1900 Kenny Road Columbus, Ohio 43210	University of Minnesota National Research Center for Career and Technical Education 1954 Buford Avenue St. Paul, Minnesota 55108
Directors:	Floyd L. McKinney	Charles R. Hopkins
Percent of Total Grant Financed by Federal Money:	100%	100%
Dollar Amount of Federal Funds for Grant:	$2,237,615	$2,237,615

Act under which Funds Administered: Carl D. Perkins Vocational and Technical Education Act of 1998 P. L. 105-332

Source of Grant: Office of Vocational and Adult Education
U. S. Department of Education
Washington, D.C. 20202

Disclaimer: The work reported herein was supported under the National Dissemination Center for Career and Technical Education, PR/Award (No. VO51A990004) and/or under the National Research Center for Career and Technical Education, PR/Award (No. VO51A990006), as administered by the Office of Vocational and Adult Education, U. S. Department of Education.

However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U. S. Department of Education, and you should not assume endorsement the Federal Government.

Discrimination: Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title IX of the Education Amendment of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Therefore, the National Dissemination Center for Career and Technical Education and the National Research Center for Career and Technical Education project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.

Table of Contents

Foreword v

Executive Summary vii

Chapter 1: Introduction 1
Data Sources 2

Chapter 2: Publications and Regional Conferences 5
Feedback on Publications 6
Suggestions for Regional Conferences 10

Chapter 3: Perceived Needs of Career and Technical Education 15
Conference Calls 15
Other Need Sensing 21

Chapter 4: An Environmental Scan and the Responses It Produced 29
Influences on Career and Technical Education in the First Decade of The 21st Century: An Environmental Scan 29
Major Trends 30
Implications for CTE 38
Responses to Environmental Scan 46

Chapter 5: Recurring Themes 53

References 57

Appendix A. States Assigned to Consortium Institutions 61

Appendix B. Summaries of Focus Groups with Key State Secondary and Postsecondary Occupational Education Leaders 63

Appendix C. Topics Discussed on CAREERTECH Listserv 81

Appendix D. Need Sensing Participants 89

List of Tables and Exhibits

Table 1.1 Participants in Conference Calls Conducted in 2001 by Region and Network 3

Table 2.1 Participants in Conference Calls on Publications and Regional Conferences by Regions and Networks 6

Table 2.2 Codes Applied to Comments about Publications 7

Table 2.3 Code Categories Applied Five Times or More to Suggestions for Regional Conferences 11

Table 3.1 Participants in Perceived Needs Conference Calls Conducted in 2001 by Region and Network 15

Table 3.2 Needs of Career and Technical Education Identified in 2001 with Selected Networks 16

Exhibit 3.1 Advisory Council Responses to "What should be the legacy [lasting contribution] of the National Centers at the end of five years?" 22

Table 4.1 Ten Fastest-Growing Occupations in the Period 2000–2010 36

FOREWORD

This report is a joint product of the National Dissemination Center for Career and Technical Education and the National Research Center for Career and Technical Education. It reflects a basic principle of both centers that their activities be responsive to the needs of the field. To honor this principle, it is essential that accurate and timely information on these needs be available. Much effort has gone into assembling such information.

My counterpart at the Research Center, Dr. Charles Hopkins, and I wish to thank all those who have contributed to this report. These include the Site Directors and field liaison staff at the five institutions that make up the consortium that operates the National Centers. Their names and the states in which they coordinate need sensing are listed in Appendix A. Many individuals participated in conference calls that served as a primarily means of data collection, and to them we express our sincere appreciation. The names of the individuals who participated in the conference calls in 2001 are listed in Appendix D.

Dr. Hopkins and I also wish to thank members of the Advisory Council and the 24 leaders of career and technical education at the secondary and postsecondary levels who met with us and shared their thoughts and suggestions on how the National Centers can best carry out their responsibilities. The report presents summaries of the key points from these meetings.

Dr. Morgan Lewis of the Dissemination Center drew upon the information obtained from these several sources to prepare this report. He has asked me to express his thanks to all those who contributed the information he reviewed, synthesized, and reported.

Floyd L. McKinney
Director, National Dissemination Center
for Career and Technical Education

EXECUTIVE SUMMARY

In 2001, the two National Centers for Career and Technical Education conducted need sensing concerning the general needs of the field, dissemination activities, and major forces in the environment judged likely to influence education in the foreseeable future. The need sensing took place with networks developed in regions assigned to the five primary partner institutions, with the National Centers' Advisory Council, with key state leaders, by monitoring discussions on CAREERTECH, the primary listserv of the two centers, and through review of pertinent literature.

The findings regarding the general needs of Career and Technical Education (CTE) primarily verified and amplified the results obtained in 2000. The main forces acting at the secondary level are pushing toward broader programs with higher standards and expectations for both academic and technical skills. Most who participated in the need sensing support these changes and believe that their programs are equipping students both to enter employment and to continue their education. They feel that the general public is poorly informed about current programs, and that this contributes to an image problem—that CTE is for the less-able student.

Recruiting and preparing instructors and administrators continue as major challenges. Pre-service programs are finding it hard to attract students, and many universities have dropped preparation for CTE. Those occupational areas that seek instructors from business and industry also have difficulty recruiting. These difficulties are likely to intensify as secondary programs increase their emphasis on the integration of academics, and teach skills needed in broad clusters rather than specific occupations.

At the postsecondary level, major concerns include accountability, articulation, professional development, and competition. Accountability data are difficult to assemble, and many traditional measures are not appropriate for students who take only a few courses to meet individual needs. Articulation both with high schools and four-year baccalaureate programs has proved difficult to achieve. The use of adjunct faculty is increasing despite persistent questions about the pedagogic skills of many part-time instructors. Leadership is an especially acute concern. High rates of retirement are expected in coming years, and it is difficult to find administrators with a background in CTE. On-line courses are increasing, and community colleges are finding it difficult to compete with national providers, such as the University of Phoenix.

The need sensing regarding dissemination activities focused on publications produced during 2000 and regional conferences that were planned for the fall of 2001. Participants in the need sensing networks were sent copies of *InBriefs*, *Highlight Zones*, and newsletters, and follow-up conference calls were scheduled to discuss usage of these publications and to obtain suggestions for increasing circulation. The overall evaluations were quite favorable; the two-page format of the *InBriefs* was especially appreciated. The major recommendation for increasing distribution was to solicit the cooperation of associations and organization involved in CTE and ask them to inform their membership about the publications. The main topics suggested for future issues were standards; technology, especially in distance learning; articulation; and assessment.

The suggestions received for publicizing and conducting regional conferences became moot when the terrorist attacks of September 11 caused the cancellation of the conferences. These conferences had been planned to facilitate extended interaction between practitioners and researchers from the National Centers. The network participants were receptive to the general approach of the conferences, but cautioned that it is difficult to find time and funds to attend the many that are already available. If they had been held, the recommendations were that they should stress specific approaches that "can be taken home."

An environmental scan was developed by assembling and reviewing a variety of documents that described trends in the environment that were judged likely to influence education in general, and CTE, in particular, in the remaining years of the current decade. The major forces identified were the echo boom, globalization, and high rates of technological change. The echo boom is the large number of students currently moving through the educational system—the children of the original baby boom. Total high-school and postsecondary enrollments in this decade will exceed the previous peaks of the 1970s. Globalization and technological change are producing rapid changes in the economy, and creating a demand for a workforce that can continue to learn and adapt. These are the driving forces behind the educational reforms that began in the 1980s.

The environmental scan was circulated to the network participants, and they were asked to react to it and assess its implications for CTE. Very few did so. Five contributed comments to an on-line discussion group, and three from the University of Minnesota region took part in a conference call. The reactions from this limited number primarily addressed the role and purpose of CTE at the secondary level. As with those who participated in other need sensing, the main theme of their comments was the broadening of CTE, with increased emphasis on academic content and articulation to postsecondary education. With this broader focus, however, those who were interested enough to comment do not want to see CTE lose it core—its focus on occupations.

CHAPTER 1: INTRODUCTION

The need sensing conducted in 2001 had three purposes, the third of which was only partially achieved. The first was to obtain feedback on the publications produced by the National Dissemination Center, and to solicit suggestions for publicizing and conducting five regional conferences that were scheduled to be held in the fall. The tragic events of September 11th caused these conferences to be cancelled, but the suggestions may have value for anyone planning activities designed to assist practitioners to use research for program improvement. Most of the conference calls conducted during 2001 addressed this purpose.

The second purpose was to complete calls that had not been conducted the prior year. The major topics of the calls from the previous year were the research, dissemination, and professional needs that should be addressed by the National Centers. Oregon State had conducted only two conference calls in 2000. In 2001, it recruited participants for the five networks it had not developed in 2000, and conducted "catch-up" calls. Ohio State also had a catch-up call with its teacher-educator network. The field liaison for the Penn State region, was seriously ill early in 2001, and this caused several of his calls to be delayed. Three of the calls were conducted after the regional conferences were cancelled. This delay shifted the focus of the discussion, and these calls mainly addressed the overall needs of the field.

The third proposed, but largely unrealized, purpose was to encourage discussion of major trends in the environment that are likely to influence Career and Technical Education (CTE) in the remaining years of the current decade. A draft document describing the most significant of these trends was prepared and distributed to the participants in the need sensing networks. They were asked to review the paper and comment on it either through an on-line (WebBoard) discussion, or to inform their field liaison that they would like to participate in a conference call. Only five participants made comments on the WebBoard, and three more participated in a conference call in the University of Minnesota region.

This report is organized by these three purposes. The remainder of this chapter provides an overview of the data sources. Following this introduction, Chapter 2 presents the feedback that was obtained on publications and summarizes the suggestions received for the regional conferences. Chapter 3 summarizes the analysis of the catch-up calls from Oregon State and Ohio State, and the Penn State calls that discussed the general needs of the field. This analysis is supplemented with additional need sensing from the National Centers' Advisory Council, focus groups conducted with key leaders of CTE, and discussions on the CAREERTECH list. Chapter 4 contains a slightly revised version of the environmental scan that the network participants were asked to review and a summary of the comments that the reviews of the scan produced. (The revision consisted of updating the occupational projections from the Bureau of Labor Statistics to reflect those published in November 2001.) Chapter 5 identifies some crosscutting themes that emerged from each of these analyses.

The report of need sensing conducted in 2000 (Lewis 2001) raised a caveat that warrants repeating: the activities described are need sensing, not needs assessment. Needs assessment is designed to assess discrepancies or gaps between "what is" and "what should be" (Witkin and

Altschuld 1995, p. 4). Needs sensing asks individuals to identify, according to their own criteria, issues or concerns that they perceive to be of importance to a defined topic. The topics examined in 2001 were how the National Centers, both Dissemination and Research, could most effectively direct their activities to address those concerns within CTE that the need sensing participants perceived to be most pressing.

Data Sources

Conference calls constituted the primary source of need sensing data. These calls were arranged, conducted, and reported by the field liaison staff of the five primary partner institutions in the two National Centers. The nation is divided into five regions, with each institution having responsibility for the states assigned to its region. (Appendix A presents a list of the states assigned to each of the partners.) In each of these regions, the site director and field liaison develop networks of seven stakeholders groups, attempting to recruit one representative from each state for each group:

1. State-level liaisons appointed by the state directors for CTE;
2. State-level liaisons appointed by the state directors for community colleges;
3. Representatives of professional and business/industry associations with an interest in CTE, including labor unions;
4. Faculty representatives of colleges and universities preparing CTE teachers;
5. Instructors from school districts that offer CTE programs;
6. Instructors from postsecondary institutions that offer CTE programs; and
7. Representatives of Native American nations and associations of racial/ethnic groups.

Attempts have been made to recruit participants from all 50 states, the District of Columbia, the Virgin Islands, and Puerto Rico. Because of time-zone differences, it is impossible to include Pacific Ocean territories in conference calls, so no attempts were made to recruit from those areas. If recruitment were completely successful, there would be 371 network participants (7 times 53). As of the end of November 2001, there were 287 participants—77 percent of the goal. A few state directors declined to appoint representatives, but mainly the problems have been identifying potential participants for the other networks, and obtaining commitments.

Even after commitments are obtained, however, scheduling the calls has proved difficult, and many who agree to scheduled times are not available when contacted. Table 1.1 shows the number who actually participated in conference calls in 2001 by region and network. The total (134) includes 6 who participated twice in the Ohio State teacher-educator calls—leaving a total of 128 unique participants, or 45 percent of the number who have agreed to take part in the need sensing.

Table 1.1
Participants in Conference Calls Conducted in 2001 by Region and Network

Networks	Regions					Total
	Pennsylvania State	Ohio State	Illinois	Minnesota	Oregon State	
State-level secondary	4	1	1[a]	4	4	14
State-level postsecondary	4	3	1[a]	6	4	18
Business/unions/assoc.	6	2	2	4	4	18
Teacher educators	3	14[b]	4	4	6	31
Instructors, secondary	3	3	2[a]	5	4	17
Instructors, postsecondary		3	1[a]	8	6	18
Tribal/racial/ethnic	2	6	2	3	5	18
Total	22	32	13	34	33	134

[a]Participated in combined secondary-postsecondary calls. [b]Includes 8 who participated in a year-2000 catch-up call discussing general needs and 6 who participated in a discussion of publications and regional conferences.

The other major need sensing sources were the Advisory Council of the two National Centers, focus groups conducted by the Center directors with key state leaders, and discussion on the CAREERTECH listserv. The members of the Advisory Council represent most of the major associations in the field, employers, organized labor, school administrators, CTE teacher educators, equity and minority advocates, and CTE student organizations. At the April 20, 2001, meeting of this council, the members were asked what they thought the "legacy" of the two National Centers should be at the end of their five-year contract. Their responses were recorded on flip charts and examined for recurring themes.

The directors of the two National Centers, Charles Hopkins and Floyd McKinney, met with small groups of leaders of CTE at the secondary and postsecondary levels. Meetings were held in St. Louis, Missouri, on May 10 and 11, with 6 secondary and 6 postsecondary leaders in separate sessions. Similar sessions were held in Scottsdale, Arizona, on September 10 and 11. The meetings were, in essence, focus groups, with the topic being: what are the major needs of CTE, and how should the National Centers respond through research, professional development, and dissemination activities?

Continuing discussions arise on the CAREERTECH listserv from time to time. The need sensing coordinator monitors all messages on this listserv, and when an on-going discussion emerges, he saves these messages for later review. The topics this year that evoked the most prolonged discussion echoed in many ways the major topic discussed last year: our society's emphasis on the four-year degree as the only route to a rewarding career (Lewis 2001). The exchanges this year often emerged from a different starting point (e.g., appropriate

terminology), but typically began to discuss what CTE is and should be, particularly at the secondary level.

The final data source was an extensive review of literature on trends likely to influence education in general, and CTE, in particular, in the foreseeable future. The methods used to locate this literature are described in Chapter 4 as part of the environmental scan.

CHAPTER 2: PUBLICATIONS AND REGIONAL CONFERENCES

The spring 2001 need sensing conference calls addressed two topics: enhancing the utility of publications produced by the Dissemination Center and providing suggestions for the regional conferences that were scheduled for the fall of the year. The following questions were asked about the publications:

- Are you using the products in any way?
- How can we maximize the use of the products?
- How could the publications be improved?
- Do you have any suggestions for topics to be addressed in future publications like these?

These questions were asked about the planned regional conferences:

- What features should these conferences have to make them attractive to you; to make you want to attend?
- How should the conferences be structured for maximum impact?
- What would be needed to enhance the chances that action plans developed at the conferences will be implemented?

As noted in the introductory chapter, these conferences were cancelled following the terrorist attacks of September 11. Nevertheless, the suggestions arising from the calls may be of use in future planning for similar conferences that are intended to make the results of research useful to practitioners.

Twenty-one conference calls were conducted in which the topics of discussion were publications of the Dissemination Center and the planned regional conferences. Table 2.1 presents the number of participants in each.

The reports of the conference calls prepared by the regional liaisons were entered into Ethnograph™, software for analysis of qualitative data, and codes were developed to classify the content. The following sections of this chapter present the results for the publications and the regional conferences.

Table 2.1.
Participants in Conference Calls on Publications and Regional Conferences by Regions and Networks

Networks	Regions					Total
	Pennsylvania State	Ohio State	Illinois	Minnesota	Oregon State	
State-level secondary	4	1	1[a]	4	4	14
State-level postsecondary	4	2	1[a]	6	4	17
Business/unions/assoc.	--	2	2	--	--	4
Teacher educators	--	6	4	4	--	14
Instructors, secondary	--	3	2[a]	5	--	10
Instructors, postsecondary	--	3	1[a]	8	--	12
Tribal/racial/ethnic	--	2	6	--	--	8
Total	8	19	17	27	8	79

[a] Participated in combined secondary-postsecondary calls.

Feedback on Publications

Three broad categories of codes emerged: topics for future publications, suggestions for distributing and increasing usage, and overall evaluations. Codes that were applied five times or more are presented in Table 2.2. The major themes relative to each of these codes are then discussed

Table 2.2.
Codes Categories Applied Five Times or More to Comments about Publications

Suggested topics		Distribution/usage		Overall evaluation	
Standards	17	Use others	22	Using	30
Technology	16	On-line	17	Positive[a]	21
Articulation	13	General	13	Length	20
Assessment	10	Format	10	Equivocal	14
Teacher education	7	E-mail	8	Readable	5
Clusters	7	Enhancements	5		
General education	6				
Student recruitment	6				
Teacher recruitment	6				
Teacher certification	6				
Student organizations	6				
Role of CTE	6				
Academic-tech integration	5				

[a] General positive comments without specific reasons, or with reasons that were coded fewer than five times.

Suggested Topics

Standards: Ten of the remarks coded *standards* related to occupational, or technical, skill standards. Four asked for analysis/comparison of how different states are dealing with national standards and certificates. The other comments referred to academic standards and their potential impact on CTE, SCANS skills as standards, and the Transitions model being tested by the North Central Association Commission on Accreditation and School Improvement. Transitions helps to tie together accountability, assessment, accreditation, and standards.

Technology: These comments were primarily about the feasibility and effectiveness of distance learning. Can CTE skills be taught through distance learning? Two other topics coded in this category were electronic portfolios and a guide to good navigational sites that help in finding information.

Articulation: Articulation agreements between secondary and postsecondary programs are difficult to negotiate. Examples of agreements that clearly specify what is necessary to obtain credit for secondary courses and have methods for tracking transition would be welcomed.

Assessment: Information is desired on assessment of technical, academic, and "soft" (employability) skills.

Teacher education: Preparation of administrators, professional development schools as opportunities for undergraduates, in-service programs, and effectiveness of distance programs were coded in this category.

Clusters: What is the status of the16 clusters adopted by the Office of Vocational and Adult Education? How do clusters relate to assessment, industry standards, and teacher certification requirements?

General education: This topic concerns general education requirements in community and technical colleges. Should CTE students have the same requirements as transfer students to ensure transferability to four-year programs?

Student recruitment: There is interest in ways to increase enrollment at both the secondary and postsecondary levels. Increasing academic requirements and block scheduling are squeezing CTE out of the high school. Fewer students are enrolling in technical programs in community colleges.

Teacher recruitment: All states are experiencing difficulties finding teachers for CTE courses. Pre-service programs have difficulty recruiting undergraduates.

Teacher certification: The teacher shortage has created interest in alternative certification. What are the states doing?

Student organizations: What skills do students develop in CTE student organizations? How are the activities of these organizations coordinated with classroom learning? What are the most effective ways for states to administer the separate organizations?

Role of CTE: This category is directly concerned with what should be the role of CTE, particularly at the secondary level. It is closely related to the role of CTE in education reform that was coded four times.

Academic-technical integration: How to do it, and evidence that integration enhances academic achievement.

Other topics suggested: Many other topics were suggested in addition to those listed in Table 2.2, but were coded fewer than five times. Following are the topics that were coded at least twice (the number following the code indicates the number of times it was applied): Definition (4), Credential (3), Contextualized teaching and learning (2), Workload (2), Accreditation (2), Perkins (2), Employability (2), Workplace (2), Diversity (2), Marketing (2), and Workforce (2). An additional 13 topics, which are not listed, were coded once.

Distribution/usage

Use others: Many suggestions were received to increase distribution by seeking the cooperation of state CTE associations and national content-area associations, such as agriculture and business, to inform their members of the publications' availability. Advertisements in *Techniques* or similar journals were recommended. One participant suggested contacting teacher educators who would find the publications useful with on-line courses. Other groups who could be contacted are community college deans and provosts, and state and local administrators and members of boards responsible for the implementation of the Workforce Investment Act.

On-line: These comments endorsed the Internet at the best way to distribute the publications. It was noted by several participants that the web addresses and availability of the publications must be widely disseminated. A search option for the web site was requested. While a substantial majority favored electronic distribution, three conference-call participants preferred receiving printed copy.

General: The comments coded in this category were primarily questions or admonitions about increasing awareness of the availability of the publications. Some participants in the conference calls were unaware of the publications until they were asked to take part in the calls.

Format: Up-front bullet points or a brief abstract were the main recommendations coded in this category. These would be helpful to those who do quick scans to decide to whom the publications should be forwarded. For the on-line versions, in-text links to cited publications would be another desirable feature.

E-mail: All of these participants preferred receiving publications as e-mail attachments. This method facilitates forwarding and is easier than going to the web. They would prefer that the e-mail be short, presenting the main topic of the publication and, if appropriate, its intended audience.

Enhancements: Enhancements recommended for the publications are a binder and an annual index.

Overall evaluation

Most of the comments coded in this section, with the exception of Equivocal, included a general positive comment about the publications. If a positive comment was accompanied by a reason for liking the publications, the reason was coded separately. Thus, all the codes reported in Table 2.2, with the exception of Positive (without elaboration) and Equivocal, are positive comments as to why the publications were liked.

Using: The most frequent usage was forwarding publications to others. This represented almost half of all comments to which using was applied. Several specific applications of the publications were cited. Teacher educators use them as reference materials in their classes. Those who teach on-line courses have linked their course web pages to the National Centers' web site. Several participants mentioned using the publications for program development, such as planning career academies, and staff development workshops. Other specific applications were in marketing CTE, development of teaching and assessment materials, and in writing proposals, publications, and legislative testimony.

Positive: This code was applied to comments such as "very good information, very useful." The number reported in Table 2.2 under this general code, however, also includes elaborations that were coded fewer than five times. These included "publications are unique and up-to date," and comments about features, such as layout or graphs, that were liked.

Length: The discussion that received this code, in all but two cases, referred specifically to the *InBriefs*. The two-page format, with references for in-depth follow-up, was widely praised. One participant said, "Even the research reports [*Highlight Zones*] I looked at were remarkably brief."

Equivocal: Twelve of the 14 comments coded Equivocal were made by postsecondary representatives. They either damned with faint praise, e.g., "Some [of the publications] are worth keeping, some are not," or noted that the contents were mainly applicable at the secondary level.

Readable: This code was applied to comments such as "well-written," "very practitioner-friendly," and "easy to read."

Suggestions for Regional Conferences

The same procedure followed for coding the feedback on publications was applied to the suggestions for the regional conferences. Once again, from a variety of separate codes, three broad categories emerged: logistics, structure, and content. Codes that were applied five times or more are presented in Table 2.3.

Logistics

Publicity: Some of these comments simply indicated the need to "get the word out," or inform people that these conferences are upcoming. Several stressed the need to provide lead time so people could include the conferences in their budget planning. Two participants suggested that a "teaser" postcard or "save-this-date" flyer might serve this purpose. Several more recommended working with state CTE and content-area associations, such as agriculture, to use their e-mail lists and newsletters. All publicity should make people want to attend by stressing the conferences' unique features, or how they will be different than others.

Table 2.3.
Code Categories Applied Five Times or More to Suggestions for Regional Conferences

Logistics		Structure		Content	
Publicity	22	Follow-up	16	Accountability	20
Who to send	19	Network	15	Specifics	15
Cost	19	Peer-to-peer	14	Best practices	7
Incentives	17	Pre-materials	12		
Alternatives	8	Business/industry	8		
Schedule	7	Why plans	5		
Source	5				
Too many	5				

Who to send: This code covers some conflicting comments. Some said their institutions would never send teams; others said teams were a good idea. Some said the attendees should be at the program/content level; others said administrators should attend to increase the chances the plans that are developed will be implemented.

Cost: Most of these comments noted that cost is always a factor—travel costs as well as the registration. Two state-level representatives said their states have a ban on all travel. A few recommended discounts for additional attendees from the same institution. Some inquired if there were any scholarships or matching funds available.

Incentives: Recognition for implementing plans developed at the conferences and graduate credit for attending were two types of incentives proposed. Some faculty participants noted that to attend a conference, they must present or in some way be involved in the program.

Alternatives: These comments concerned ways of making the conference content available to those who could not attend. Among the ways suggested were compressed video, an on-line or satellite conference, a PowerPoint presentation attendees could take back to share with colleagues, and postings to the National Centers' web page.

Schedule: Almost all of these comments suggested linking the regional conferences with others that already have a large attendance, to minimize travel costs. Conflicts or close scheduling with other conferences were also noted.

Source: This was a subcode to cost. The most specific suggestion was to provide information about upcoming conferences to local districts in time for them to include the cost in their application for Perkins funds. Questions about the availability of scholarships were also coded in this category.

Too many: The number of competing conferences was the theme of all these comments.

Structure

Follow-up: About two-thirds of these comments stressed the need to follow up with conference participants to determine the extent to which they had implemented their action plans. The remaining one-third recommended keeping in touch with participants, including developing networks among those who attend, to provide ongoing advice, guidance, and sharing.

Network: All 15 who made comments coded Network want time during the conference to meet and share experiences with other attendees.

Peer-to-peer: These comments were similar to those coded Network, but stressed practitioners talking to practitioners, especially practitioners associated with exemplary practices. One participant from a multi-campus community college would especially appreciate the opportunity to meet with others from similar institutions.

Pre-materials: The materials sent out prior to the conferences should provide information about the topics and presenters, and also specific starting and ending times, and travel times from the airport to the hotel, so people can plan their trip most efficiently. Information about expectations for the action plans was also requested.

Business/industry: Several call participants would like to see business and industry representatives in attendance and as presenters. They feel this would be validation of the utility of the information, and encourage partnerships.

Why plans: Four of the five comments coded Why plans came from one conference call with local secondary representatives. They wondered why action plans were needed. They claimed they all had their own plans and needed information on how better to implement them, not another plan.

Content

Accountability: The number of comments coded as Content that the regional conference should address was fewer than the other broad categories. Among those that were included, Accountability was the clear leader. Several call participants linked accountability to the Perkins requirements—how can these be met? Three postsecondary representatives spoke of accountability in reference to how a "program completer" is defined. Many of their students leave when they have achieved their personal objectives, but not the full program. In a conference call, the Arizona participants reported their state has adopted an accountability system, labeled the Friedman model, that they feel is quite effective. A local-level secondary representative recommended the Transitions model being tested by the North Central Association Commission on Accreditation and School Improvement. Transitions helps to tie together accountability, assessment, accreditation, and standards.

Specifics: This code refers to the direct applicability of the topics discussed. The call participants want to get information that "gets to the mechanics of doing things," "practical skills that can be taken home," and "topics that help me teach students."

Best practices: These seven comments all asked that the conferences give them opportunities to learn more about best practices or exemplary programs—especially from practitioners directly involved with them.

CHAPTER 3: PERCEIVED NEEDS OF CAREER AND TECHNICAL EDUCATION

This chapter presents data on the *perceived* needs of Career and Technical Education (CTE) that emerged from four sources: conference calls, the Advisory Council of the National Centers, focus groups with key state leaders of CTE, and discussion on the CAREERTECH listserv. (Perceived is italicized to emphasize the difference between need sensing and needs assessment. See discussion in Chap. 1.) During 2001, six calls were conducted that originally had been scheduled for 2000. They had been delayed because of difficulties in recruiting participants for the networks. In addition to these six, four of the 2001 calls in the Penn State region were delayed by the illness of the field liaison. When they were conducted, their discussions were mainly on general needs, rather than on publications and regional conferences. This is understandable, for three of them took place after the regional conferences had been cancelled.

Need sensing was conducted with the Advisory Council at the April 20, 2002, meeting. The council members were asked to indicate what they thought the lasting contribution, or "legacy," of the National Centers should be at the end of their five-year contracts. The directors of the two centers also conducted four focus groups with key leaders from the secondary and postsecondary levels. A total of 24 administrators took part in these sessions, six in each group. The final source is discussion on the CAREERTECH listserv. Topics that prompted extended exchanges of information and opinion were saved for analysis. This chapter summarizes the results from each of these sources.

Conference Calls

Table 3.1 shows the number participating in the conference calls conducted in 2001 that discussed general needs of the field. Note that two of the five regions, those assigned to the University of Illinois and the University of Minnesota, had no catch-up calls in 2001. In addition, the state-level director representatives at the secondary and postsecondary levels in all five regions had participated in the general needs conference calls in 2000, and were not contacted on this topic in 2001. These representatives did participate in the 2001 calls on publications and regional conferences.

Table 3.1.
Participants in Perceived Needs Conference Calls Conducted in 2001 by Region and Network

Networks	Regions			**Total**
	Pennsylvania State	Ohio State	Oregon State	
Business/unions/associations	6		4	10
Teacher educators	3	8	6	17
Instructors, secondary	3		4	7
Instructors, postsecondary			6	6
Tribal/racial/ethnic	2		5	7
Total	14	8	25	47

The reports from the conference calls were coded using the categories that emerged from the calls conducted the prior year. Many of the highest ranking needs from the 2000 calls were also high ranking in the 2001 calls, but the order was not identical. The biggest difference was the number of comments coded Professional development. The number of calls conducted with teacher educators explains the frequency of this topic. There were three of these calls, and in each, professional developed dominated the discussion. There were two calls with three of the other networks, and only one with postsecondary instructors. Table 3.2 shows the number of coded comments by networks

Table 3.2.
Needs of Career and Technical Education Identified in 2001 with Selected Networks

Codes	Teacher educators	Instructors		Business/ unions/ associations	Tribal/ racial/ ethnic	Total
		Secondary	Post			
Professional development	35	3	6	1	-	45
Image of CTE	5	8	4	15	3	35
Teaching/learning	8	18	5	-	2	33
Instructors/administrators	13	-	2	2	-	17
Technology/distance ed	8	2	1	3	-	14
Guidance	-	10	-	1	1	12
Skill shortages	-	-	3	8	-	11
Partnerships	1	3	2	4	-	10
Exemplary	2	2	-	5	-	9
Multiple problems	-	-	1	-	6	7
Assessment	1	1	2	3	-	7
Articulation	1	-	2	2	-	5
Other	11	-	1	6	5	23
Total	85	47	29	50	17	228

Roughly 25 needs were coded for each conference call, except for those with Tribal/racial/ ethnic networks. These two calls were re-examined to determine why they had far fewer coded needs. A large portion of the Oregon State call consisted of the participants describing their programs and the special problems that their clients encounter. Much of this discussion did not fit the coding system used to classify needs. The Penn State call had only two participants, and their interaction did not generate as many comments as the calls with more people involved.

Comparison of 2000 and 2001 Results

In this next section, the main results from 2000 and 2001 are compared, and then the comments coded under each of the categories shown in Table 3.2 are summarized.

There are four major differences between the results obtained in 2000 and 2001:

- Professional development was coded far more frequently;
- Clearinghouse was coded far less frequently;
- Partnerships and Exemplary programs were coded less frequently; and
- Guidance and Articulation emerged as significant categories.

The reasons underlying the large number of references to professional development have already been discussed. As Table 3.2 indicates, this is a primary concern of teacher educators, and there were more conference calls with these stakeholders than with the other groups in 2001. The drops in the number of comments coded Partnerships and Exemplary are also partly explained by the number of teacher educators in 2001. Teacher educators did not frequently cite these needs in 2000.

The large drop in comments citing the need for a clearinghouse of information on CTE is less easy to explain. In 2000, all networks, except secondary instructors, mentioned a clearinghouse, and teacher educators mentioned it most frequently. In the 2001 calls, there were only two comments coded Clearinghouse. (All comments coded fewer than 5 times are combined in the Other category in Table 3.2.)

References to the need for more and better guidance and better articulation between secondary and postsecondary were more frequent in 2001 than in 2000. Ten of the 12 comments coded Guidance were from secondary instructors, and nine of these were from the same conference call. This illustrates one of the methodological difficulties of this type of data collection. If a topic stimulates considerable discussion in a conference call, each comment on this topic from a different participant is coded separately. This results in a high count for that particular need. The assumption is that truly durable and pervasive needs will emerge across regions and across networks, and usually this is the case. The number of comments coded Guidance in these calls is an exception.

Several of the needs that emerged as major in 2000 were duplicated in 2001, especially the following:

- Image of CTE;
- Teaching and learning (under which were coded integration, relevancy, and contextualized instruction);
- Instructors/administrators (primarily shortages in these areas); and
- Technology/distance education.

These needs were among those most frequently cited, and their frequencies by networks were similar to those found in 2000. The image issue arose in each network, and especially frequently among Business/unions/associations and Secondary instructors. Teaching/learning was the dominant topic among secondary instructors. The shortage of instructors and administrators was the second most frequent concern of teacher educators, following Professional development. This was a reversal of the order found for this group in 2000.

The primary contents coded under each of the categories in Table 3.2 are summarized in the following section.

Comments by Code Category

Professional development: Much of the discussion in this category concerned certification and alternative certification. In some of the states represented in these conference calls, requirements are moving in different directions. Teacher educators from Arizona, Pennsylvania, and Virginia stated that standards are becoming lax, and superintendents of local districts have considerable freedom to issue emergency certificates for CTE teachers. Their counterparts in Maine, and the State of Washington, however, reported more rigorous standards. Washington now requires certification of postsecondary instructors, and has specified the skill standards expected of instructors in community and technical colleges. [Information about these standards can be obtained from the Center for Learning Connections, Highline Community College, Skill Standards Resource Center (PMNI), P.O. Box 98000, Des Moines, WA 98198-9800, or by visiting the website http://www.wa-skills.com.]

Other issues coded under Professional development included the need to translate research findings into formats that are usable by teachers, the concern that few administrators have any background/preparation in CTE, and the desire for a clearinghouse that listed on-line teacher preparation courses. Several comments also addressed preservice preparation, including recruitment of students, appropriate curriculum, and the charge that higher education is out of touch with today's high schools.

Image of CTE: The image of CTE, more precisely *changing* the image of CTE, was the need most frequently cited in the year 2000. All the need sensing networks and other data sources that were examined identified this need. The concerns raised in 2001 were very similar to those discussed in 2000 (Lewis 2001). These are the recurring themes:

- Our society's focus on the four-year degree as the only way to a rewarding career;
- The perception that CTE is most appropriate for special needs students and others who cannot meet academic requirements;
- The desire for reliable data that document the benefits of CTE to the individual and the economy; and
- Changing the perception of CTE so it is seen as broadening, not limiting, career options.

Teaching/learning: Comments in this category came mainly from secondary instructors. Teachers are interested in material that has direct relevance in their classroom. One teacher put it this way: "Programs are sold and are of interest to administrators, but teachers are interested in lessons, not programs." Typically, teachers have limited opportunity to influence decisions about programs, but they have almost complete control over what they do in their classrooms. They are continually searching for better ways to engage students and enhance learning. If they find something that works that they can use, they are likely to try it.

Other comments echoed themes heard in 2000: integration of academic and technical instruction, contextualized learning, responding to multiple intelligence levels and different learning styles, and keeping instruction relevant to the requirements of employers.

Instructors/administrators: This category, like Professional development, consisted primarily of comments from teacher educators, and referred to the shortage of both certified teachers and administrators with experience in and understanding of CTE. These shortages are as acute at the postsecondary level as at the secondary level. Some participants cited the income differences between teachers and technical/skilled workers as the core of the problems of shortages.

Technology/distance education: There is considerable interest in how CTE courses and certification courses for instructors can be delivered effectively on-line. Examples of both were noted. A licensed practical nurse program in Idaho uses televised courses to reach remote locations. Hawaii also uses distance learning for health education. Virginia and North Carolina are offering on-line certification courses. There is a general sense that on-line courses have much potential, but there are concerns about the expenses of developing them, and the extent of training needed for instructors to use technology effectively.

Guidance: As noted above, almost all the comments coded Guidance arose from one conference call with secondary instructors. Their discussion touched on the poor quality of guidance, the lack of information on how guidance and exploratory technical courses influence students, and the limited follow-up information on students after they leave school. There is some information on graduates, the number entering postsecondary institutions, average SAT scores, etc., but information on what happens to dropouts is nonexistent.

Skill shortages: As in 2000, representatives of business, professional, and labor associations were the most likely to mention skill shortages. Shortages of workers with technical skills were cited, but some spoke of the difficulty of finding workers with the necessary soft (employability), basic communication, and computational skills. A theme in these discussions is that educators are not aware of what technical jobs in industry now require in terms of problem-solving and computational skills.

Partnerships: The obvious response to the need for greater understanding of industry needs is closer relationships with employers. Participants in four of the networks contacted in 2001 called for more linkage and collaboration. The potential benefits would be a higher likelihood that instruction is relevant, as well as the potential of developing powerful advocates for CTE. Also coded under this category were suggestions for the National Centers to link with other

organizations involved in CTE such as V-TECS, the National Occupational Competency Testing Institute, and the Southern Regional Education Board.

Exemplary: Requests for the identification and dissemination of information about Exemplary, or best, practices were not as frequent in 2001 as in 2000, but they expressed a similar desire: information about successful programs in sufficient detail that their practices could be considered for adoption. High Schools That Work was commended for its identification of pacesetter schools that have improved the academic and technical skills of CTE students.

Multiple problems: Representatives of tribal, racial, and ethnic groups made all but one of the references to the multiple problems of their clients/students. Almost all spoke of limited-English ability that makes it difficult for students to benefit from instruction. Older students who have lost long-term jobs and have poor basic skills constitute another group with multiple problems.

Assessment: The comments coded in this category touched on many aspects of assessment, including alternative assessments, such as portfolios; assigning academic credit for work experience; the impact of high-stakes tests on CTE; and the relationships between skill standards and assessment.

Articulation: The awarding of transferable academic credit for certification programs was mentioned in two different conference calls. The need for better articulation was expressed, and examples of successful articulation were described.

Other: All segments from the reports of conference calls that were coded fewer than five times were combined in this category. Consequently, these segments touch on many different topics. Included were requests for a clearinghouse, which was only coded two times. In 2000, this had been one of the most frequently cited needs. There was only one reference to the implications of the Workforce Investment Act for CTE, which had also emerged as a major need in 2000. Recruitment and retention of students was coded three times. Identifying the most appropriate accreditation body for postsecondary institutions was coded twice. All other comments in this category were coded only once. Here is a sampling of issues coded once:

- Teachers are very busy and want information in small bits–a silver bullet, so to speak.
- How is block scheduling affecting CTE student organizations? Is the quality of the experience declining because of the limited amount of time that can be devoted to these activities?
- Key people have lost touch with the Centers.
- The number of teachers who access CTE-related data is quite low. Where are secondary and postsecondary educators getting their information from? The issue of the credibility of information becomes a concern.
- Superintendents should be held accountable for student performance, or the lack thereof, including the problem of dropouts.

Other Need Sensing

Advisory Council

The need sensing with the Advisory Council consisted of a round-robin listing of responses to the question: "What should be the legacy [lasting contribution] of the National Centers at the end of five years?" The main points of each member's contribution were written on flip charts. Exhibit 3.1 presents a listing of the 32 comments in the order in which they were made. Because of the way the comments were elicited and listed, counting the number of times a topic was mentioned does not reflect the importance or extent of agreement on that topic. Council members did not repeat points that were already on the flip charts, and no attempt was made to rank the importance of those that were listed.

What follows is a judgmental clustering of the contents of the 32 items in Exhibit 3.1. The bulleted phrases attempt to synthesize the main points of the items grouped in a cluster. The numbers of the items in the clusters follow in parentheses. The bulleted phrases are the answers to the question: "What should be the legacy of the National Centers at the end of five years?"

- Credible research findings that provide direction for the future and influence policy (2, 3, 5, 6, 7, 8, 11, 12, 14, 19, 21, 23).
- Enhanced emphasis on professional development impacting teacher education and leadership (15, 16, 18, 24).
- CTE is perceived as a key component of educational reform (10, 17, 27).
- Improved perceptions of the value of CTE (1, 9, 13).
- Other specific suggestions (4, 20, 22, 25, 26, 28, 29, 30, 31, 32)

The number of the item indicates the order in which it was listed. Over one-third of the suggestions, including many of those listed in the first round, concerned research findings that can influence planning and policy. The suggestions grouped in the Other category cover a wide spectrum from the very broad, such as numbers 4 and 32 in Exhibit 3.1, to the specific, such as numbers 21, 22, and 26. The dominant themes can be summarized as follows: the Advisory Council wants the National Centers to conduct and disseminate research that is grounded in education reform, influences policy, and improves the image of CTE and the quality of its professional development.

Exhibit 3.1

Advisory Council Responses to "What should be the legacy [lasting contribution] of the National Centers at the end of five years?

1. Role in increasing the value of work
2. Policymakers have reasons to support CTE
3. Unbiased research and recommendations on where we need to go and how to keep us strong (note the variability in CTE)
4. Programs that aid students in choosing or advancing in the lifelong careers/choice of work
5. Profiles of good practices related to outcomes disaggregated by populations related to current policy issues
6. Research that is usable and "friendly" disaggregated to meet needs of information seeker
7. Increased respect for CTE and its research
8. Focus on policy-shaping issues; a piece in each study that specifically addresses that; not just federal, include state also
9. Greater awareness/clarification of misperceptions of CTE
10. Focus on all students
11. Information to assist in future planning for CTE
12. Produce and disseminate evidence that CTE helps students stay in school, achieve, and enter and advance in a career
13. CTE is so important that "NBC" will host programs on CTE
14. Information on the impact of CTE on business and industry (show the value)
15. Identify our next wave of leaders
16. Reverse the trend in CTE – teacher education programs
17. Place CTE in the center of education reform
18. Make professional development as important as research
19. Evidence of the impact of career counseling—results
20. Align curriculum and pedagogy with existing/emerging skill standards
21. Public has access to and values CTE and its research
22. Impact of clustering and certification
23. Greater presence with National Governors' Association
24. Provide specific recommendations for improving quantity and quality of teachers
25. Maintain postsecondary focus
26. Impact of dual enrollment. What does it mean? (issues: repackage/deconstruction, destabilizing high schools, pulling out the best and brightest from high school, unintended consequences)
27. We should be part of the discussion of the reconceptualization of the American high school
28. Diversify NCCTE funding to foundations and others
29. Focus on cultural diversity in the workplace
30. Alignment of CTE performance assessments and more traditional forms
31. Our results should be so powerful as to make it [CTE] compelling to all funders
32. Place Centers' work in broader context, i.e., economy

Focus Groups with Key State Secondary Leaders

The overarching theme of both the May and September sessions with selected state secondary leaders was the purpose/role of secondary CTE, and how this fits in the present context of school reform and high-stakes testing. Other issues were raised, but underlying most of them was what secondary CTE should attempt to accomplish, and how its performance should be assessed. The following summary was developed by reviewing the notes of the sessions that were prepared by the facilitators, Charles Hopkins and Floyd McKinney.

The school reform movement is pressuring secondary programs toward broader goals than they have traditionally tried to achieve. This pressure takes the form of higher academic standards, mandated testing to ensure the standards are met, career clusters, and enhanced articulation typically in the form of career academies or Tech Prep. Each of these is intended to maintain options for young people. The reforms are attempting to provide the skills needed both to enter employment following high school and to pursue further education.

Also influencing secondary CTE is increased emphasis on skill standards and certification of these standards. The National Skill Standards Board has developed a method to certify the skills necessary for major industry categories. Some states are requiring CTE teachers to have certification from recognized national sources for the occupations that they teach. These influences push programs toward the specific skills required for certification.

State leaders thus find their programs are being asked to achieve potentially conflicting objectives: (1) enhance academic skills, (2) cover a broad cluster of related occupations, (3) incorporate skill standards that lead to certification, and (4) prepare young people to continue their education after high school. Is it possible to achieve all of these objectives? If it is possible to design appropriate programs (and some would claim career academies and Tech Prep are such programs), where will the teachers come from? Teachers who are hired for their technical skills typically have experience in specific occupations, such as carpentry or electricity, not in all construction-related trades. Such instructors rarely have any preparation in how to use their occupational content to teach academic skills.

These are the major concerns relative to the role of secondary CTE raised by the state leaders in the focus groups. Some even expressed the fear that if secondary programs become so broad they are no longer grounded in specific occupations, secondary CTE will cease to exist.

Other issues that were raised included many that already have been discussed in this report. The following arose in both the May and September sessions:

- Accountability/assessment/evaluation, particularly authentic assessment and the relevancy/legitimacy of traditional academic measures when applied to CTE;
- Articulation/transfer/dual enrollment;
- Contextualized (applied) teaching and learning, problem-based learning;
- E- (distance) learning, effective use of information technology;

- Image of CTE, improve perceptions, counter mis-information, convince policymakers of CTE's value; and
- Professional development, recruitment and retention, supply and demand of teachers and administrators.

The final major topic discussed with the state leaders was their suggestions for effective dissemination and professional development activities. The suggestions from the two sessions were almost identical: Provide information as succinctly as possible (bullet-points), use electronic media, target state staff, and present and disseminate at existing conferences and state meetings.

Focus Groups with Key Postsecondary Leaders

The postsecondary leaders of occupation education were less concerned with the purpose of CTE than their secondary counterparts. They raised the issue mainly with regard to how changes at the secondary level might affect postsecondary programs. There was no question that the teaching of occupationally specific skills was appropriate at the postsecondary level. The summary of their discussion, like that for secondary leaders presented above, is based on notes of the sessions prepared by the facilitators. The topics discussed are grouped into related themes.

Accountability/credentialing/certification: Accountability, in its many ramifications, was a dominant theme of the September session, as well as being frequently discussed in May. The participants noted the difficulties associated with all methods of assembling follow-up information on former students. The Workforce Investment Act promotes the use unemployment insurance wage records to obtain data on employment and earnings, but there are many difficulties associated with assembling and analyzing these records, including the fact that some states will not release them.

Often traditional outcome measures are not appropriate. A significant proportion of community college students do not enroll in a program of study. Instead, they take one or more courses to meet their individual needs. One of the participants referred to students taking "chunks of learning." Many of these students already have bachelor's or advanced degrees. The number of these reverse-transfer students is growing—especially in areas such as information technology, where there is a high demand in the labor market.

What is an appropriate measure of successful completion for such students? Should the attainment of specific competencies to meet individual needs be recognized through some sort of credential? A somewhat related issue is the certification of "soft" (employability) skills. All employers want workers with these skills, which are essential to retaining employment. Despite their importance, few institutions provide any documentation that their students demonstrate such skills.

Articulation and transfer: The community college representatives in these two groups expressed a need for improved articulation—both with high schools and four-year institutions. They raised the question as to where occupationally specific training should begin, and noted

that declining enrollments in secondary CTE programs are having an impact at the postsecondary level. They especially noted a decline in male enrollments in occupational programs.

The resources that community colleges must devote to developmental (remedial) programs were discussed. Questions were raised as to when and how developmental instruction should be offered in occupational education.

Professional development: Discussion of professional development dealt primarily with the shortages of instructors and administrators, and the instructional skills of individuals who are hired to teach because of their technical expertise. Community colleges anticipate high rates of retirement among their presidents. One participant cited a projection that 1,000 first-time college presidents will retire in the next few years. If all these retirement were from the 1,163 colleges that are members of the American Association of Community Colleges (AACC), they would affect almost 90 percent of these institutions. (http://www.aacc.nche.edu)

The pedagogical skills of instructors are another concern. Community colleges are increasingly using part-time, adjunct faculty who hold full-time jobs in the technical areas that they are hired to teach. This has the advantage of bringing current industry practices into the classroom, but most of these instructors have had no preparation in how to teach. The participants would welcome exemplary models that provide direction for how to deal with this problem.

To increase the impact of the National Centers in dissemination and professional development, the participants in the May sessions urged greater linkage with other institutions, organizations, and conferences already performing these functions. They cited the many programs and subgroups of AACC, such as the Workforce Development Institute and the National Council for Occupational Education, which carry out highly related activities.

Competition/E-learning: Both the May and September sessions discussed the competition that community colleges are experiencing from on-line providers, e.g., University of Phoenix (http://www.phoenix.edu/index_open.html), and corporate learning enterprises, e.g., Microsoft Certified Systems Engineer (http://www.microsoft.com/traincert/mcp/mcse/default.asp). E-learning (primarily on-line courses) was seen as having considerable potential, and many community colleges are offering such courses. Developing and merging these courses with existing programs, however, has proved difficult, and the participants in the focus groups fear that their institutions are losing potential students to larger, more recognized providers. Improving faculty competence in e-learning and the retention of students in on-line courses were noted as additional problems.

Workforce development: Community colleges are heavily involved in workforce training, but it remains an ill-defined area that must respond to many demands. Employers want the colleges to produce workers who meet their skill requirements, but often these requirements are not clearly communicated. Better partnerships with business and industry are desired, but what are the best ways to make them happen? What is the value added from good partnerships?

Some employers contract for customized training for incumbent workers. Such training is, by definition, relevant to the needs of the employers who pay for it, but how can it best be integrated with the overall mission of the college? The Workforce Investment Act (WIA) mandates state and local councils to determine the types of training that will be supported, as well as the kinds of accountability data that will be provided. The required data must be for all students in programs that enroll any WIA clients. Some community colleges are questioning whether the small numbers of WIA clients that they enroll justify this major data collection and reporting burden.

Image of CTE: As in virtually all other need sensing, the image of CTE arose in the focus groups, more so at the September than at the May session. The topics were similar to those found in other sources: the perceived status of a two-year degree, in comparison to a four-year degree, as well as the desire for better information on the value of two-year programs and for better counseling and guidance.

Exemplary programs: Another recurring need is for information on exemplary programs. Sometimes this is expressed generically, i.e., "We need to know what works," but more typically it arises in specific contexts, such as "Identify best practices for all levels of learners" or "What works to recruit new students?"

Demographics: The participants would like more information on how shifts in the characteristics of students are affecting, or should affect, programs. Community colleges have always served a wide cross-section, but their enrollments are becoming even more diverse with proportionally more minorities, older workers, WIA and welfare-to-work clients, and reverse transfers. What programmatic and instructional changes are needed to accommodate this increased diversity? How can the performance gaps across socioeconomic groups be minimized?

Apprenticeship: Questions about apprenticeship arose at both the May and September sessions. A comparison was requested of the comparative values of apprenticeship, internship, and unrelated work experience. Other questions were raised about new models (not further specified) and European practices.

The topics summarized above are those on which there was discussion at both sessions with the postsecondary leaders. There were other topics raised at one or the other session that are not included here. For detailed notes of the four sessions, see Appendix C.

CAREERTECH Discussion

In 2001, four issues were raised on the National Centers' listserv, CAREERTECH, that stimulated five or more substantive postings. (As of December 31, 2001, the listserv had 792 subscribers.) Appendix D presents samples of the postings under each of these topics. If anyone wishes to read the original postings, they are available in the CAREERTECH archives. The instructions for accessing the archives are presented in Appendix D.

Percent obtaining degrees: In early January, a discussion continued for one week on the percentage of students who obtain bachelor's degrees. The point made in several of the postings is that, by far, the majority of young people do not obtain four-year degrees. Statistics from various sources were quoted.

Literacy testing of CTE teachers: An inquiry about states that require literacy, not technical-skill, testing of CTE instructors yielded responses from several states, as well as from Canada, Finland, and the United Kingdom. The person making the original inquiry compiled a list of states requiring such testing, and offered it to anyone who was interested.

High-stakes testing: A posting on the effect of high-stakes testing led to a prolonged discussion of what should be expected of CTE students with regard to academic skills, and whether it was a responsibility of CTE courses to teach such skills. Some believe high-stakes testing is causing students to drop out. Others argued an occupational context contributes to the teaching of academic skills. One summed up her position as follows:

> Old assumption: academics and career-technical education are two dichotomous choices. New assumption: academics and career-technical education are an integrated whole that addresses both content and methodology for teaching/learning.

Other issues raised in this on-going discussion addressed charter schools to prepare young people for careers, alternative testing, the difficulties experienced in school by children who receive little or no parental support for their education, the need to combine the career development process with the teaching/learning process, and the increased academic demands of many occupations.

Terminology: On August 6, 2001, Dr. Ken Hoyt, former director of the Office of Career Education, U.S. Department of Education, responded to a posting that had categorized topics under the headings: "Career Education," "Career-Technical Education," and "Adult Education." He asked if there is some consensus definition of the term "career-technical education," or is it simply a new name for what we used to call "vocational education."

This posting stimulated a prolonged discussion of terminology and the devaluation of the word "vocational"—again raising the most-discussed issue on the listserv: the emphasis our society places on the four-year degree. In November, similar themes were discussed concerning the number of jobs that will be created in coming years that will require a bachelor's degree.

Montgomery County Workgroup: In addition to samples of the postings on these four topics, Appendix D presents the findings and recommendations from a workgroup that examined CTE in Montgomery County, MD. This posting did not lead to a continuing discussion, but the findings reflect most of the themes that have consistently arisen in the need sensing conducted in 2000 and 2001. This posting provides an example of how one district has responded to concerns that have been expressed from need sensing participants across the country.

CHAPTER 4: AN ENVIRONMENTAL SCAN AND THE RESPONSES IT PRODUCED

To supplement the original data collected for the need sensing, an environmental scan paper was produced and submitted to the networks in the five regions for their review and response. The network participants had two ways in which they could respond: participate in an on-line dialogue or inform the field liaison for their region that they would like to participate in a conference call to discuss the paper. Very few choose either option. Five people contributed to the on-line discussion, and three people in the Minnesota region participated in a conference call. This chapter presents a slightly revised version of the environmental scan that was sent to the participants on October 12, 2001, and the responses from the eight who reviewed and reacted to it. The revisions in the scan incorporate the new economic and labor force projections published by the Bureau of Labor Statistics in the November 2001 issue of *Monthly Labor Review*.

Influences on Career and Technical Education in the First Decade of the 21st Century: An Environmental Scan

Throughout its history, the field that now calls itself "Career and Technical Education" (CTE) has continually responded to the changing demands of society and the economy. In the period since the Vocational Education Act of 1963, the pace of change accelerated, as vocational-technical education assumed a more prominent role in national policy directed to workforce development and the needs of underserved populations. In 1998, the cumulative effects of these adjustments were among the factors that led to a change in the name of the American Vocational Association. This association has its origins in efforts during the early years of the 20th century to obtain federal support for vocational education in the high school curriculum. In 1998, as the century drew to a close, the governing body of the association voted to change its name to the Association for Career and Technical Education. This name change can be interpreted as an effort to assist the profession to prepare for the challenges that a new century was sure to bring.

This paper attempts to identify major trends that are judged likely to create the challenges by shaping the environment in which education, in general, and CTE, specifically, will operate. The method used is an environmental scan: the assembly and analysis of information on anticipated developments in areas that are known to have impact on education (Morrison, 1985). The paper focuses primarily on demographics, technology, and the economy.

Method

An environmental scan is typically conducted by several people who agree to report and collectively assess developments they judge likely to have an impact on their organization. One person conducted this scan. I [Morgan Lewis] did it by searching the Internet and educational abstracts for literature concerning the future for education. An Internet search conducted on July 9, 2001, using the search engine Google and the key words "environmental scan," "education," and "trends" yielded over 113,000 hits. Another search using "future" and "education" yielded 35,400 hits. I reviewed only a very small number of the descriptions of these hits and linked to

the sites of those that looked promising, until this yielded very little new information that appeared relevant. Similar searches were made of the ERIC database and *Education Abstracts*.

The documents that were assembled from these searches constitute the data for this scan, and they represent a judgmental sample of a universe of possible sources that is too large to study directly. The summaries of the documents that are reported reflect additional judgments about what appears to be the consensus of credible sources. Documents from sources such as the Education Commission of the States and the Organisation for Economic Co-operation and Development are given more weight than those from individual authors. The scan could thus be accused of a bias toward the "official" worldview of dominant institutions in the national and world economy. Such institutions have an inherent interest in preserving the major structures of society, and their official publications would be expected to reflect conventional wisdom and advocate incremental, rather than radical, change.

Somewhat surprisingly, therefore, virtually all the sources examined concur that advanced industrialized nations may be in a time of radical change that will have international impacts. The convergence of globalization and information technology may be creating a transformation where old patterns will no longer hold. The future may not be a continuation of the present. Even if we are in the midst of major transformation, however, we must live our lives and make our plans one day at a time. An understanding of the forces shaping the environment for CTE can contribute to more informed decisions.

Major Trends

This paper was prepared to provide a foundation for the planning for CTE. Its primary audience is the staff of the National Centers, but it may be of use to those responsible for planning CTE at any level. First, it examines demographic trends and their implications for enrollment and the need for instructors at the secondary and postsecondary levels through 2010. It then presents several assessments of the potential impact of technology and globalization on the economy. It concludes with a discussion of how changes in the skills needed for the workforce may affect CTE, especially at the secondary level.

Demography

The workforce grows through three sources: new entrants, re-entrants, and immigrants. New entrants are young people who have matured to the point that they begin working for pay. This is the group of most concern to CTE, and the numbers in this group will be examined in most detail.

The students who enroll in CTE courses at the secondary level were in almost all cases born 15 to 17 years earlier. The birth cohort that has been labeled the "baby boom echo" is now moving through the education system. Current enrollments in grades 9–12 are almost as high as during the peaks of the 1970s, and in the remainder of this decade they will be even higher.

The post-war baby boom is usually defined as the period from 1946 to 1964. The start is dated by an increase of over half a million births in just one year—from 2,858,000 in 1945 to 3,411,000 in 1946. The boom's end is marked by a drop in 1965 below the rate of over-4,000,000 births per year that had held for more than a decade. Births continued to decline through the 1960s and early 1970s to a low of just over 3,100,000 in the period 1973–1976. In 1977, the baby boom echo began, and births increased, until in the period 1989–1993 they were once again over 4,000,000 each year. (www.cdc.gov/nchs/data/wh/statab/unpubd/natality/nata97.htm)

The oldest members of the echo cohort have, for the most part, completed their formal education, but many more are moving through the system, and they will keep secondary enrollments high through the first decade of the 21st century. The National Center for Education Statistics has made the following projections to the year 2010:

- The 5- to 17-year old population is projected to increase from 50.9 million in 1998 to 52.0 million in 2010—an increase of 2 percent. The 18- to 24-year-old population is expected to increase from 25.6 million in 1998 to 30.3 million in 2010—an increase of 18 percent.
- Total public and private elementary and secondary enrollment is projected to increase from 52.5 million in 1998 to 53.5 million in 2005—an increase of 2 percent. Then total enrollment is projected to decrease by 1 percent, to 53.0 million, by 2010, resulting in an overall increase of 1 percent from 1998.
- High school graduates from public and private high schools are projected to increase from 2.7 million in 1997–98 to 3.1 million by 2009–10—an increase of 14 percent. This significant increase reflects the projected rise in the 18-year-old population.
- Higher education enrollment is projected to increase from an estimated 14.6 million in 1998 to 17.5 million by the year 2010—an increase of 20 percent. A 17-percent increase is projected under the low alternative and a 24-percent increase is projected under the high alternative. (http://nces.ed.gov/pubs2000/projections/highlights.html)

Implications: Anticipating secondary enrollments from number of births is one of the safest types of projections, but how many high school students will choose to enroll in CTE classes? How many high school graduates will pursue postsecondary education, at less than the bachelor's level? How many who have completed a four-year degree will enroll in postsecondary technical programs? These questions cannot be answered by projecting the number of births 15 to 22 years earlier. The answers will be produced by million of individuals who will make decisions that will be influenced by many considerations, including our society's valuation of the attainment of a bachelor's degree, the economic benefits of such degrees, and the demand for technical skills in the workforce.

The most recent published data on secondary enrollments in vocational courses only go to 1994, but what is available shows a decline that may well have continued during the remainder of the decade:

> From 1982 to 1994, there was a general decline in the participation of high school students in vocational education. The percentage of public high school graduates taking at least one vocational education course decreased slightly. However, the decline in the percentage of graduates completing a sequence of related occupational courses was more dramatic (Levesque, et al., 2000, p. 49).

During the period from 1982 to 1994, the average number of Carnegie academic credits earned by high school graduates increased from 14.3 to17.6, but the average for vocational credits declined from 4.7 to 4.0. The percentage of high school graduates classified as vocational concentrators declined from 34 to 25 percent. Concentrators were defined as graduates who took three or more courses in a single occupational program area. Using a more restrictive definition of vocational specialist (four or more courses in a single area, with at least two above the introductory level) the percentages fell from 13 to 7 percent, or almost half. Levesque and her co-authors (2000) cite the publication of *A Nation at Risk* in 1983 (National Commission on Excellence in Education) as a likely cause of both the increase in academic and the decrease in vocational credits.

The efforts at education reform stimulated by *A Nation at Risk* continue unabated; indeed, one could say they are intensifying. High-stakes testing has become the main policy initiative to ensure achievement of learning standards. In January 2002, President Bush signed into law the keystone of his educational policy, the reauthorization of the Elementary and Secondary Education Act, the *No Child Left Behind Act of 2001*. This act requires states to establish accountability systems that include annual testing in grades 3 through 8 as a requirement for receiving federal funds. This increasing emphasis on testing of traditional academic skills could serve to further erode enrollments in traditional CTE courses. An alternative possibility is that broadening CTE by using contextualized learning to improve both academic and technical skills may counteract the effects of high-stakes testing. Possible changes in secondary CTE are examined in more detail later in this paper.

For the past several years, about two-thirds of high school graduates continued on to postsecondary education, with a little more than half (55 percent) entering four-year institutions. These ratios have been fairly steady for most of the past two decades, and they are projected to hold to 2010. Of those choosing two-year colleges, the best available data (Berkner, Horn, & Clune, 2000) imply that about half plan on studying technical skills to prepare for employment.

National data on reverse transfers—students with bachelor's or advanced degrees enrolling in two-year technical programs—are difficult to locate. Kent Phillippe, an analyst with the American Association of Community Colleges, has provided by personal communication an estimate from survey data that about 3 percent of full-time students and 8 percent of part-time students have bachelor's degrees, with wide variation across technical areas. Information technology is reputed to have especially high enrollments of those with bachelor's degrees. Extrapolations from the National Household Education Survey (Kim & Creighton, 1999) provide another estimate. This survey found 12 percent of adults with bachelor's degrees were enrolled in formal postsecondary program leading to degrees or

other education certificates related to qualification for jobs, excluding those who were enrolled full-time. This percentage is calculated on a base of 55.7 million adults with bachelor's degrees, yielding an estimated total of 6.7 million part-time students working toward additional employment-related credentials in both two- and four-year institutions.

It is a certainty that during the current decade the number of young people in the 14 to 22 age range will increase significantly. If past proportions hold, CTE enrollments, especially at the postsecondary level, should be expected to increase at least at the same rate as total enrollments. Conservative estimates indicate that administrators at both the secondary and postsecondary levels will have even more difficulty finding adequate numbers of instructors in coming years than they are at present.

While the number of secondary students in the middle years of the decade will exceed the peaks of the 1970s, the overall impact of the echo generation upon society will not be as significant as that of their parents. In 1950, when the baby boomers were poised to begin their education, the total population of the United States was 150.7 million. In 1980, when the echo boomers were at the same stage, the population was 226.5 million—50 percent larger (U.S. Census Bureau, 2000). The total number of elementary and secondary students during these same years shows an even larger difference. In the 1949–50 school year, total enrollments were 25.1 million; in 1979–80, there were 41.7 million—a 66 percent increase (Snyder & Hoffman, 2001).

The other two major sources of new workers, re-entrants and immigrants, have fewer implications for CTE. Re-entrants are unlikely to make up a major segment of those seeking preparation for occupations. Labor force participation rates are already high, and there does not appear to be much potential for many not already seeking work to begin to do so (Fullerton & Toossi, 2001). The nation is absorbing large numbers of immigrants, both documented and undocumented, but few of these new workers are likely to seek training. Registered immigrants typically have skills needed in the workforce. In many cases, having a skill for which there is shortage is a condition for obtaining an immigrant visa. Undocumented aliens typically enter jobs that require little or no prior training or experience.

Technology and the Economy

There is a striking level of agreement across sources as to the major forces that will affect education in the first decade of the 21st century. Here are some examples:

- Increasing dominance of technology in economy and society;
- Increasingly global society;
- Expanding education throughout society, throughout lifetimes (Education Commission of the States, 1999, p. 1);
- … the main trends influencing the world economy over the next couple of decades will include economic, political and cultural globalisation[sic], with the productive process integrated at the inter-country level. The business environment will increasingly be

dependent on strategic information management, implying that the education system will have to teach students how to evaluate and manipulate information, not just how to find and store it (Organisation for Economic Co-operation and Development, 1999a, p. 1).

- We have considered the emerging challenges of the 21st century—a century that will be an era of knowledge, information, and communication. Globalization and the revolution in information and communication technology have signaled the need for a new human-centered development paradigm (Second International Congress on Technical and Vocational Education, 1999, p. 3).
- Global competition, the Internet, and widespread use of technology all suggest that the economy of the 21st century will create new challenges for employers and workers (U.S. Department of Commerce, U.S. Department of Education, U.S. Department of Labor, National Institute for Literacy, and Small Business Administration, 1999, p. 1).

The two forces that emerge across all sources—technology and globalization—are to a considerable degree interrelated. The revolution in access to information and the ability to transmit it instantaneously are among the major contributors to a world economy. This economy creates a demand for a workforce able to use information to achieve competitive advantage, and this demand is the primary impetus for educational reform in the United States. The soundness of the economy and America's competitiveness in international markets will be major determinants of the environment for education in the coming decade.

Any projection about the economy is clouded, and the longer the period, the greater the uncertainty. Nevertheless, in the fall of each odd-numbered year, the Bureau of Labor Statistics of the U. S. Department of Labor makes projections 10 years into the future of how many will be employed in occupations with large numbers of workers. The most recent projections, for almost 700 occupations to the year 2010, are presented in the November 2001 *Monthly Labor Review*, and on-line at http://www.bls.gov/opub/mlr/mlrhome.htm.

The occupational projections are based on a model of the total economy of the United States that involves over 2,100 variables. About 10 percent of these variables (234) require estimates of such things as the price that refiners must pay for crude oil, the effective federal personal tax rate, and federal payments for Medicare. When all the estimates for the model were made and the calculations completed, Su (2001) summarized the results as follows:

> Finally, the projections are based on an assumption there will be no major wars, oil embargoes, significant price shocks, or serious natural catastrophes of a magnitude that would affect the long-term growth potential of the economy during the projection period. In sum, the projections anticipate a growth economy, including a steady expansion of the labor force, strong productivity growth, a favorable outlook regarding inflation, and good opportunities for jobs (p. 17).

The Organisation for Economic Co-operation and Development (1999b) has examined the future of the global economy and reached a similar optimistic conclusion:

> As the 20th century draws to a close, powerful forces of change are converging that could set the stage for a long, sustained economic boom in the next few decades—the transition to a knowledge-base society with its potentially huge productivity gains; the emergence of more deeply integrated, global markets for goods, services, capital, and technology; and a fast-growing environmental awareness that could greatly accelerate the shift to new, less resource-intensive production and consumption patterns. The result could be several decades of above-average economic growth, substantial increases in income and wealth, and significant improvements in well-being across the world (http://www.oecd.org/sge/au/Futureoftheglobaleconomy.htm).

After the original draft of this paper was completed, the September 11 attacks on the United States occurred. This may be one of the major shocks referred to by Su that could affect the long-term growth of the economy. Recent analyses have concluded that the economy was already in a recession prior to September 11, and that the attacks could deepen and prolong the period of lower productivity. (The popular, although not technically accurate, definition of a recession is two or more consecutive quarters of decline in the Gross Domestic Product).

As this is written, the armed forces of the United States are operating in Afghanistan, and many Americans expect new retaliatory strikes that the terrorists have threatened. No one can anticipate how long the battle with terrorism will last or the effects it will have on economic activity. After this paper was sent to the network participants for review, the Bureau of Labor Statistics issued its fall 2001 projections that extend to the year 2010. The following statement accompanied this release:

> The Bureau of Labor Statistics projections presented in this issue were completed prior to the tragic events of September 11. While there have been numerous immediate economic impacts, the nature and severity of longer-term impacts remain unclear. At this time, it is impossible to know how individual industries or occupations may be affected over the next decade. The Bureau will continue to review its projections and, as the long-term consequences of September 11 become clearer, will incorporate these effects into subsequent releases of the labor force, industrial, and occupational outlook. (http://www.bls.gov/opub/mlr/mlrhome.htm, 2001)

If the attack and its sequelae do not have major impact, and the United States economy operates in the way the econometric model used by the Bureau of Labor Statistics projects, the occupations in Table 4.1 will be the 10 fastest growing in the period 2000 to 2010. Eight of the 10 are information technology occupations, reinforcing the broader assessments of the impact of this technology, as presented above. The effects of the personal computer are also seen among occupations that are projected to experience the largest declines: order clerks, word processors and typist, and computer operators.

In discussing fast growing and declining occupations, CTE educators must keep in mind that many occupations that are not experiencing rapid growth still have a large need for replacement workers. The more workers employed in an occupation, the greater the replacement need, regardless of whether the occupation is growing or declining. The number of retail salespersons is one of the more dramatic examples. The number in this occupation is projected to increase only 12 percent from 2000 to 2010, but the total job openings during this period will be almost 2,000,000 because of the number of such positions and their high turnover. No growth is expected in the number of secretaries (not legal, medical, or executive); still, there will be over 300,000 job openings created by those who leave existing positions.

Table 4.1
Ten Fastest-Growing Occupations in the Period 2000–2010

Occupation	Employment		Change	
	2000	2010	Number[1]	Percent
Computer software engineers, applications	380	760	380	100
Computer support specialists	506	996	490	97
Computer software engineers, systems software	317	601	284	90
Network and computer systems administrators	229	416	187	82
Network systems and data communications analysts	119	211	92	77
Desktop publishers	38	63	25	67
Database administrators	106	176	70	66
Personal care and home health aides	414	672	258	62
Computer systems analysts	431	689	258	60
Medical assistants	329	516	187	57

Source: Table 3. Fastest growing occupations, 2000–2010. (Hecker, 2001, p.79).
[1]Numbers in thousands of jobs.

Are there other technologies, beyond information technology, that appear likely to create a need for workers with specialized skills in the coming decade? One source that sheds light on this question is the GW [George Washington University] Forecast of Technology and Strategy (on-line at www.gwforecast.gwu.edu). In July 2000, William Halal, the originator and director of the forecast, published a list of the 10 technologies he expects to have the most impact during the first decade of the century:

1. Portable information appliances rival PCs. By 2003, 30% of industrialized nations will use portable devices to surf the Net, send e-mail, watch video, and more.

2. Fuel-cell powered cars hit the streets. Toyota and Ford should introduce experimental fuel-cell automobiles by 2004.

3. Precision farming becomes ultra-efficient. Satellite data and computerized tractors should boost crop yields within a decade.

4. Millions of consumers buy customized merchandise online instead of visiting stores. Virtual shopping could account for one-third of the U.S. economy by 2007.

5. "Teleliving" becomes the lifestyle of choice by 2010. People at home and work will access streams of information through large wall monitors.

6. Virtual assistants handle routine chores. By 2007, sophisticated software will create computerized helpers to file, screen calls, and write letters.

7. Genetically designed species of plants and animals enter the mainstream by 2008. Biotechnology will improve crop production to feed a more-populated world.

8. Computers take over health care tasks. By 2009, more-powerful hardware and software systems will keep medical records, fulfill prescriptions, and monitor patients.

9. Alternative energy challenges carbon-based fuels. Within a decade, alternative energy sources—wind, solar, geothermal, biomass, hydroelectric—will meet 30% of all energy needs.

10. Smart robots take on sophisticated jobs. Decision-making robots that do complex factory work and assist the handicapped will arrive by 2010. (www.wfs.org/prgwforecast.htm).

Half of these top 10 (those numbered 1, 4, 5, 6, and 8) are applications of information technologies. Fuel-cell-powered cars and alternative energy sources could have implications for training programs, but here again CTE educators need to be cautious. It is only when a technology has achieved wide commercial application that it begins to require large numbers of specially trainer workers.

Flynn (1988) has identified a skill-training cycle in the applications of technology. The development and diffusion of a technology typically assumes an "S" shape. In the first stage, the developers are scientists and engineers with specialized knowledge. This stage represents the low, slowly rising part of the S curve. As a product is adopted and begins to have economic impact, the knowledge needed to use it typically becomes more standardized. New occupations emerge that do not require extensive background in the underlying principles of the technology. Formal training in the needed skills begins to be provided by market-sensitive educational institutions. If the product provides real advantages, usage expands rapidly, and more schools and colleges offer training for the related occupations. A chart showing the extent of usage during this expansion phase represents the rapidly ascending part of the S. As the product reaches maximum market penetration, growth slows and may even decline. The flatness of the usage curve during the stability or decline phase completes the S.

A recent example of such a curve is the usage of personal computers in the last three decades of the 20th century. The transistor, the basis of microelectronics, was developed in 1948. The transistor laid the foundation, but personal computers were not possible until many components could be combined into a single integrated circuit—a microchip. When microchips became available, many tiny firms began making personal computers, but they had limited usage until Apple, Radio Shack, and Commodore began aggressive marketing. With the Apple II in 1977, the usage curve began to grow, and it accelerated in 1981 when IBM entered the field and established a de facto standard (Lubar, 1993).

In the early stages of its development, knowledge of programming language was needed to use a personal computer. By the mid 1990s, almost anyone who could point and click a mouse could operate a computer, which had replaced typewriters in almost every office. By July 2001, sluggishness in the economy was attributed in part to declining demand for computers. It could be that the personal computer, as we currently know it, has entered the stability/decline segment of the S-curve of its usage. Halal, whose list of 10 technologies was presented above, believes that computers that use electrical currents will soon reach their limits. He thinks they will be replaced by optical computers that use light waves, rather than electricity, by around 2015 (www.wfs.org/inthalal.htm).

Even if the market for personal computers is slowing, all sources examined for this paper agree that the potential of microelectronics is just beginning to be tapped. The application of this technology, especially to information and communication, is so profound that many futurists, most notably Alvin Toffler (1980), believe the impact on society will be comparable to those arising from the agricultural and industrial revolutions. Landow (1992) has compared electronic text processing to the invention of moveable type: "It promises (or threatens) to produce effects on our culture, particularly on literature, education, criticism and scholarship, just as radical as those produced by Guttenberg's moveable type (p.19).

One thing is certain: change is inevitable, and globalization and information technology will accelerate the pace. To adapt to inevitable change, workers will have to become life-long learners, and that lies at the core of educational reform. Our collective, inchoate awareness that we will continue to experience profound change transcends our individual perceptions. We struggle to cope with these changes and push our educational institutions to prepare young people who will be better equipped to continue the struggle. So what does this all mean for CTE? To that question we next turn.

Implications for CTE

This document began with a search to identify the major trends likely to influence the environment in which CTE will operates. It ends attempting to anticipate the form that CTE—particularly secondary-level programs—will take in coming years. Because of the need for workers who can continue to learn and adapt to inevitable change, our nation is engaged in an on-going debate as to the kind of education most likely to produce such workers. For CTE, it comes down to a question of whether high school students can be taught occupationally specific skills while also being prepared to be life-long learners. Few question the appropriateness of

occupationally specific training at the postsecondary level. Indeed, teaching such skills is primarily what much of higher education is about. The more advanced the education, e.g., medical residencies and law school, the more occupationally specific the preparation.

In 1999, Pautler asked several of the leading scholars of CTE to examine the current status of their field and to attempt to anticipate the major challenges that the new century would bring. Reflecting the changing environment in which the field functions, the title of the book does not include the words *vocational education*. Instead, it is titled, *Workforce Education: Issues for the New Century*. Nine year earlier, in 1990, Pautler had edited a similar book, with several of the same chapter authors, which had the title *Vocational Education in the 1990s*. Blank, in the 1999 book, discusses an appropriate name for the field, given what he hopes will be movement toward a role and mission broader than it has traditionally played.

Discussions of role, particularly the role of secondary programs, appear in most of the chapters. Writing in the final years of the century, the authors felt the need to review the debate that had preceded the introduction of vocational education into the curriculum almost 100 years earlier. This debate continues to the present. For example, Pucel (1999), who prepared the chapter on curriculum, lists as one of the critical issues the following:

> If the role of secondary vocational education is not to prepare students for particular occupations, why not have the academic program in the high school adopt applied learning methods and do away with secondary vocational education? (p. 218).

In considering this question, Pucel concludes: "The debate over whether vocational education has substance or is essentially a vehicle for teaching other subject matter is probably the most important issue facing vocational education" (p. 219).

The following are selected views of the future presented by other writers in Pautler's 1999 book.

Miller and Gregson (1999) approached the question of the future of vocational education from a philosophical perspective. Their application of the tenets of "pragmatism revisited" yields a conclusion virtually identical to those arising from the analysis of major trends:

> The overarching purpose of vocational education should be to help facilitate the growth of learners who are competent as: problem solvers, collaborators, makers of meaning, lifelong learners, worker-citizens adaptable to change and active as change agents, and practitioners of democratic processes (p. 32).

Gray (1999) frames the future as a choice between education through occupations (the new vocationalism) and traditional/tech prep. By grouping tech prep with traditional, Gray implies that tech prep is not part of the new vocationalism because it continues skill training for those students who will seek full-time employment after high school—as well as preparing them for postsecondary technical education (p. 165). He concludes that

traditional/tech prep is likely to prevail, but with an emphasis on broad clusters rather than in-depth, occupationally specific preparation.

Walter and Farmer (1999) identify three primary issues that postsecondary vocational education must address in coming years: partnerships, remediation, and transferability. "Partnerships" is further divided into those between secondary and postsecondary programs, and those between postsecondary programs and business and industry. They advocate the use of national skill standards to facilitate both types of partnerships. National standards can be used to align the content of secondary and postsecondary programs and serve as the basis for awarding advanced credit, while ensuring that students at both levels are being prepared for the requirements of the workplace.

Whither Secondary CTE?

The convergence of globalization and technological change has produced reform efforts that are impacting all of education. Within CTE, these reforms have had their main influence at the secondary level. CTE has changed and will continue to change, but in what directions? At least five possible emphases appear possible, if not equally likely:

- The new vocationalism;
- Rigorous traditional programs, the High Schools That Work model;
- Elimination of occupational preparation;
- Integration of vocational content into a single curriculum for all; and
- Enhanced articulation: career academies and tech prep.

Each alternative has its advocates, and their positions are examined.

New Vocationalism: In the academic journals, most references to the new vocationalism see it as a return to the principles of John Dewey. Among Dewey's many contributions to educational thought was support for the use of occupational content to achieve general education goals. At a time when manual training and vocational instruction were struggling to become part of the high school curriculum, Dewey described these innovations as:

> ...one of the most vital movements now operating for the improvement of existing general education. The old-time general, academic education is beginning to be vitalized by the introduction of manual, industrial, and social activities; it is beginning to recognize its responsibility to train all the youth for useful citizenship, including a calling in which each may render useful service to society and make an honest and decent living (1913, p. 144).

Grubb (1996) is probably the most prominent advocate of the Deweyan form of the new vocationalism. He has brought renewed attention to Dewey's phrase *education through occupations*. Grubb proposes a curriculum structured around broad occupational clusters in which the teaching of academic skills would, in the current parlance, be contextualized in teaching about occupations. Content would be presented in a constructivist, problem- or project-

based manner that is designed to teach concepts applicable to all occupations within the cluster, as well as related literature and social studies.

Lakes (1997) has examined the new vocationalism from three perspectives: Deweyan, Marxist, and Freirean. His Deweyan interpretation is very similar to Grubb's. His Marxist and Freirean interpretations have few implications for educational practice beyond suggesting ways to increase student awareness of how education in an advanced capitalistic society contributes to the reproduction of social class. Heaney (1995), an American scholar of Freir, concluded a review of attempts to establish Freirean programs in the United States that applies equally well to Lakes' analysis of the implications for CTE:

> The survivors—those liberatory programs in the United States which have maintained their vision—await the revolution and attempt to prepare learners for political options not yet available. (http://nlu.nl.edu/ace/Resources/Documents/FreireIssues. html)

Bragg (2001a) has identified six principles as the core of the new vocationalism:

1. An emphasis on career clusters, or pathways, that extend from entry- to professional-level in career fields integral to the new economy.
2. Changes and enhancements in the vocational curriculum by integration of academic and technical concepts, and teaching all aspects of the industry sectors that students are preparing to enter.
3. Inclusion of career ladders connected to continuing educational opportunities.
4. Encouragement of constructivist theories, active teaching strategies, and learner-centered, project-based instructional approaches.
5. More meaningful curriculum and instruction, so an increasing number of students can benefit from vocational education.
6. Efforts to ensure that vocational education is more highly integrated into the K–16 educational system and into broader economic and social structures.

Lynch (2000b) has written extensively on the future of CTE, but does not use the term *new vocationalism* in a paper he prepared for the ERIC Clearinghouse on Adult, Career, and Vocational Education and summarized in the *Journal of Vocational Education Research* (2000a). The new directions foreseen, however, are consistent with Bragg's core principles; and Lynch thinks these will be implemented through high school majors (which will replace tracking), career academies, and tech prep.

Gray (1999) uses the term *vocationalism* quite differently than the writers cited above. Gray defines it as follows:

> ...organizing curriculum in such a way as to provide students with the opportunity to develop skills, both vocational and academic, that will give them the strategic labor market advantages needed to compete for good jobs (p. 86).

Using this definition, Gray sees the current emphasis on college preparation as vocationalism, which he believes misdirects those from the "academic middle," and leads to failure and frustration in higher education for a large percentage of students.

Rigorous Traditional Programs: The new vocationalism is the future most debated in the literature. Another option, High Schools That Work (HSTW), is far more than a proposed pedagogy; it is ongoing innovation in some 1,100 high schools in 26 states (http://www.sreb.org/programs/hstw/hstwindex.asp). The core of HSTW is higher expectations and standards. Its web site lists the following as its key practices:

- High expectations—setting higher expectations and getting more students to meet them;
- Vocational studies—increasing access to intellectually challenging vocational and technical studies, with a major emphasis on using high-level mathematics, science, language arts and problem-solving skills in the modern workplace and in preparation for continued learning;
- Academic studies—increasing access to academic studies that teach the essential concepts from the college preparatory curriculum by encouraging students to use academic content and skills to address real-world projects and problems;
- Program of study—having students complete a challenging program of study with an upgraded academic core and a major;
- Work-based learning—giving students and their parents the choice of a system that integrates school-based and work-based learning. The system should span high school and postsecondary studies, and should be planned by educators, employers, and employees;
- Teachers working together—having an organization, structure, and schedule giving academic and vocational teachers the time to plan and deliver integrated instruction aimed at teaching high-level academic and technical content;
- Students actively engaged—getting every student involved in rigorous and challenging learning;
- Guidance—involving each student and his or her parents in a guidance and advising system that ensures the completion of an accelerated program of study with an in-depth academic or vocational-technical major;
- Extra help—providing a structured system of extra help to enable students who may lack adequate preparation to complete an accelerated program of study that includes high-level academic and technical content; and
- Keeping score—using student assessment and program evaluation data to improve continuously the school climate, organization, management, curricula, and instruction to advance student learning and to recognize students who meet both curriculum and performance goals.

HSTW is education through occupations, but it is also education for occupations. Students study specific skills to prepare for employment, but they are also expected to meet academic standards that will enable them to pursue postsecondary education if they so wish.

Elimination of Occupational Preparation: At a polar extreme from HSTW is the elimination of occupational instruction from the high school, and this is the policy preferred by the president of the National Center on Education and the Economy, Marc Tucker. Tucker directed the staff that produced the influential report, *America's Choice: High Skills or Low Wages* (Commission on the Skills of the American Workforce, 1990). That report introduced the concept of a "Certificate of Initial Mastery" that all students should attain as a prerequisite for further education and training. Setting the content and assessment for the standard would be the responsibility of state and local educational authorities. Tucker would like to see the certificate "...include reading, writing, speaking, mathematics, science, history, and applied learning (meaning nonacademic skills—such as problem solving, ability to use information technology and systems thinking—that are required in the modern workplace irrespective of the particular kinds of work to done)" (Tucker, 1999, p. 25).

With such a certificate in place, Tucker believes high schools should focus their efforts as follows:

> The first job of the new American high school should be to bring all its students up to the certificate standard. The second job should be to provide a first-class college prep program for students who have received their certificate and want to prepare themselves for competitive college entrance exams.
>
> That is all. And it is enough. It will be very hard for American high schools to bring all their students to the certificate standard and provide a first-class college prep program. To do that much is to ask more of our high schools than all but a few have been able to do up to now (Tucker, 1999, p. 28).

The text from which the paragraphs above are quoted has the title *The New American High School*. There has been a federal effort since 1996 to identify and recognize high schools that use the same label, but the 59 schools that have received this recognition have not all adopted the certificate of initial mastery approach (http://www.ed.gov/offices/OVAE/nahs/nahsfaq.html). These schools were selected because of their success in establishing high standards, expectations, and performance as measured by indicators such as SAT scores, graduation rates, and transition to postsecondary education.

One of the major educational reform initiatives, the Coalition of Essential Schools (http://www.essentialschools.org), does not explicitly reject CTE, but its principles tend to squeeze it out of the high school curriculum. All essential schools agree to implement 10 common principles that are designed to assist students achieve high levels of mastery in a limited range of content areas. The architectural phrase of Mies van der Rohe, "less is more," has been adopted to capture this focus. The skills that are stressed are predominantly academic, and thus leave little room for CTE (Muncey and McQuillan, 1996; Stingfield, et al., 1997).

Unified Curriculum: Lewis is a primary spokesperson within CTE for a "common core of school knowledge." He proposes a unified curriculum for all students that is not all that different from the approach advocated by Tucker:

> What I have in mind is a unitary curriculum, one that is not hierarchically ordered, and that is devoid of tracks. All students would have equal chances of engaging in a breadth of studies supportive of wide-ranging vocational insight. All would pursue academic subjects; all would learn about the world of work (Lewis, 1998, p. 283).

Lewis agrees with Tucker in rejecting any type of tracking because it is inherently undemocratic and discriminatory. Lewis differs from Tucker in the emphasis he places on education about work as a part of general education. His rationale endorses the approaches inherent in the new vocationalism and HSTW, but not if they are offered as part of a tracked curriculum for students who are disproportionately poor and minorities. All students should learn about work because it is a critical component of life, it is valid knowledge that should be a part of all learning, and "...it facilitates cognition by its situated, contextualized, nature." (Lewis, 1998, p. 302).

Lewis acknowledges the difficulty of achieving what he proposes in a comment on HSTW. He commends the approach for stressing more rigorous academics, but would prefer "...simply to do away with tracks. Admittedly, that is easier said than done, requiring as it does the transformation of the society" (p. 290).

Enhanced Articulation: Between the extremes of elimination and a unified curriculum, and incorporating elements of the new vocationalism and increased rigor, are two models of enhanced articulation: career academies and tech prep. Both attempt to provide a career-focused curriculum that enables young people to enter the workforce upon leaving high school, to continue their education at the postsecondary level, or as many choose, to do both. They differ, however, in the direction of their articulation. Career academies combine the 11th and 12th grades, in which CTE is usually delivered, with the preceding two years of high school. Tech prep most often articulates with the two years following high school, but there are variations including 4 + 2 models that include all four years of high school; 2 + 2 + 2 that lead to a bachelor's degree, and 4 + 2 + 2 (Bragg, 2001b).

Career academies had their origins in programs designed to serve students at risk of dropping out (Kemple & Snipes, 2000). Parnell (1985) is credited with setting forth the basic design of tech prep as a way to serve the *neglected majority*—those students in the middle of the normal intelligence curve. As the educational reforms of the 1980s unfolded, both career academies and tech prep broadened their goals to serve all types of students. Tech prep was endorsed and funded in the federal vocational education legislation of 1990 and 1998 (Perkins II and III). When the School-to-Work Opportunities Act was enacted in 1994, career academies and tech prep provided models for serving all students through curriculum organized around occupational clusters.

Kerka (2000) identified the following three essential features of career academies:

1. A school within a school cluster of students who typically stay with the same group of teachers for 2–4 years, forming a close-knit learning community that gives students personal support.
2. Partnerships with employers who sponsor career awareness and work-based learning opportunities, and provide resources and financial support.
3. Integrated academic and occupational curriculum centered on a career theme, occupation, or industry to provide focused, situated learning.

Bragg (2000, pp. 223–226) has presented the provisions of the authorizing legislation for tech prep in Perkins II and III. The following is based on that table:

1. Articulation agreement between the participants in a consortium.
2. Two years of secondary school preceding graduation, and two or more years of higher education, or an apprenticeship following graduation with a common core of required proficiencies designed to lead to an associate degree or certificate in a career field.
3. Curriculum that meets state academic standards, links secondary and postsecondary instruction, incorporates work-based learning, teaches all aspects of an industry, and uses appropriate technology.
4. In-service training for implementation of tech prep that keeps teachers and administrators current with the needs and expectations of business, prepares instructors for contextual, applied instruction, and equips them to use technology.
5. Training for counselors to enable them to provide information and support to students about tech prep and its related employment opportunities.
6. Equal access to the full range of tech prep for special populations.
7. Preparatory services to assist participants in tech prep.

Conclusion

This scan will not attempt to predict the future; it makes no judgments about which alternative future is most likely to unfold. There is widespread agreement, indeed virtual consensus, on the major forces that will shape education in coming years, and these have been presented above. The basic direction of our nation's response to these forces has emerged in the form of higher expectations, higher academic standards, and testing to ensure the standards are achieved. The implications of this response for CTE, especially secondary CTE, will be determined by the decisions of thousands of state and local policymakers. It is the goal of the National Centers for CTE to provide research and analyses that will inform these decisions. It is hoped that this paper contributes to that goal.

Responses to Environmental Scan

The participants in the need sensing networks were asked to react to the scan, and given two options: participation in an online WebBoard discussion or in a conference call. Very few chose either option: five posted comments on the WebBoard, and three took part in a conference call. This section presents the WebBoard discussion, with some slight editing, and a summary of the conference call that was prepared by reviewing the report of the call prepared by Dr. Chris Bremer, field liaison for the University of Minnesota region.

WebBoard Comments

Mike Rush, State Administrator, Professional-Technical Education, Idaho

I enjoyed the paper by Morgan Lewis. I think he did a pretty thorough job of identifying the various trends. The additional component that needs to be fleshed out is not "what skills do students need to have" or "do we need occupational training or strong academic subjects," but rather why a particular instructional approach is more or less likely to get us closest to the educational goals we all pretty much agree upon. It is a mistake to assume that if we want broad, well-rounded thinkers that the solution is only to teach broad, generic skills. The opposite has more often been proved the case. Furthermore, treating career-technical education simply as an instructional methodology will drain it of the very essence that makes it effective as an instructional methodology. The following comments illustrate these two positions.

Career-technical education draws its organizational infrastructure (and therefore its very existence) from the occupations for which it prepares. It is those careers or occupations or jobs that define its curricula, provide the framework to make decisions about what is taught and what is not, and provides the public support and understanding. It also defines the educational infrastructure necessary to making career-technical education work in the educational system. To define career-technical education programs as simply a teaching methodology that enhances and informs academic education will be short-lived. Let me explain. Academic education, for all the talk about integration, still is defined by traditional academic disciplines. Math is still defined by math educators and math professors who go to math conferences and read math journals. The math teachers may visit with the English teachers and develop a joint course, but the system still defines and produces math teachers and English teachers—not integrated math/English teachers. That is why it is invariably the career-technical educators who are in the lead on integration of subjects, applied curricula, and the like. The organizational structure career-technical educators look to is an occupation or career that, by its very nature, requires integrated skills. Therefore, it is natural for career-technical educators to respond to requirements that cross academic disciplines.

The only way career-technical educators will be able to continue that role is to maintain the close association with the organizational framework that makes it possible.

I am concerned about a definition that defines career-technical education as a methodology. It can offer hands-on educational expertise to the traditional academic disciplines; it can offer the across the board integration inherent in occupations to academic disciplines; but it cannot become those things. It must maintain an identity tied to something that exists outside of the educational environment, or else the only other organizational structure in education (that of traditional academic disciplines) will eventually erase not only career-technical education, but also the added benefits that career-technical education can offer.

This does not mean that career-technical education should be separated from mainstream education any more than math should be separated from English. We should continue to have math and English teachers, and the disciplines from which they draw their essential content should remain intact. The only two structures (outside of our interpretations in education) from which curriculum can be drawn are either the academic disciplines as defined by society at large (e.g., mathematicians, English professors, historians, etc.) or from the real world in which those skills are integrated and used, i.e., occupations or careers. The problem with most integration efforts is that when academic teachers get through integration activities in education, they still go back to their roots. They go to math conventions, go to classes taught by math professors, read math journals, and read articles about Nobel Prize winners in math. There are no Nobel Prizes for integrated education. Forces outside of education also drive career-technical educators, but their curriculum comes from what it takes to perform in a career. This curriculum is, by its very nature, integrated. It requires good math and communication, as well as specific, knowledge and skills. That is why integration is most often referred to in career-technical contexts, and driven primarily by people involved with career-technical education.

If the curriculum for career-technical education no longer comes from the occupational world, then it no longer has any structure upon which to draw. The only driver left for educational curriculum will be traditional academic disciplines. I think both must continue to exist.

How we define "specific job training" is probably the biggest issue. I think the primary difficulty with Prosser-like Trade and Industrial programs was that any integrated academic skills were discounted in favor of rote memorization of tasks. That made some of those programs not fertile ground for developing higher order academic and problem-solving skills. The reaction, therefore, is that specific job training is no longer important. That is changing, however, even in the traditional programs. The very nature of the occupations themselves has forced teachers into a much more "thinking" approach to the instruction.

I am convinced that specificity is the key to educational excellence. Generic-su ey-course type education is not motivating; it leaves little room for complex thinking, and therefore cannot teach the important transferable skills. If you look at almost any type of educational program recognized for its excellence, that recognition comes from its depth, rather than its breadth. Boise schools here in Idaho, for example, are known nationally for their music program. Boise students regularly win national competitions in orchestra, choir, jazz choir, etc. They win because the programs are competitive to get into, require hours of student practice time in and out of class, and require mandatory attendance at all concerts. This level of concentration goes well beyond

what it takes to appreciate music, or recognize composers, or even play instruments. One might argue that all that time students spend concentrating in a narrow area of music would work against high level performance in other areas. The reality, however, is exactly the opposite. The students who spend incredible amounts of time on very specific, targeted practice are better in all academic subjects, have higher order problem-solving skills, etc.

I could list a number of other examples of schools and programs that have received considerable renown, and in virtually every case it will be the high-end, in-depth components that generate the recognition and the measurable performance differences. I think the same is true of technical programs. Those that go into depth are those with the most potential of developing important academic skills, problem solving, use of information, etc. If the general education track experiment that we have been trying has proved anything, it is that we don't want to duplicate that failure with technical programs. I do think career pathways can provide an excellent way to broaden the scope and acceptance of technical education. Agricultural education, as well as business and office education, has already been much closer to that model. In many ways, it would be difficult to define current Agricultural Science programs as "specific job training," since they don't match the Prosser model. They are specific, however, in that they are driven by the agricultural industry, and do provide specific venues in which to develop high-level skills.

Martha Rader, Associate Professor, Curriculum and Instruction, Arizona State University

The "Trends" article is great. However, after reading it, I realized that one of the greatest research projects the Center could do is to compile some national statistics on vocational education enrollments. We are estimating and extrapolating data from census data because the USOE stopped collecting data on a national level in 1994. I inquired at a national business education conference this weekend about the possibility of getting national data on business education enrollments, and I was informed by Janet Treichel, Executive Director of the National Business Education Association, that the only way to get national enrollment statistics in business education would be to send a survey to all 50 state directors of business education, and compile the data myself, because the information is no longer collected in Washington. That's a pretty sad state of affairs. Could the Center at Ohio State collect the data from the various states and compile them? Federal reports are prepared by each state and turned in to the USOE, but nobody puts it all together and prepares a report. It would be a pretty simple thing to do. Can the Center at Ohio State do that for all voc ed program areas, and then compile a grand total? That is certainly very important information that needs to be available.

Hollie Thomas, Professor, Educational Leadership, Florida State University

Morgan is to be congratulated for pulling an excellent review of the trends, and the implications of the trends, for CTE. This makes the job of the reviewer difficult—suggestions for improvement are not easy to make. I do, however, think that the field could benefit from a review of several trends that are not included here. Some of these data may be available, while other data may not. My first concern is the trend of high school graduation. If my data are accurate, we have gone from a graduation rate of 80 percent in 1963 to 75 percent in 2000. For

all of our reform in education, we do not seem to be serving the needs of students. Can a society afford to relegate 25 percent of the population to the "educational reject" category? One wonders what occupations these non-graduates are entering. Given the higher dropout rate, we might expect higher performance of those who graduate. This brings us to the next concern in the trend data. Is the academic performance of our high school graduates increasing? I heard on the news today that the science performance scores are down—purportedly because of the emphasis on reading and math scores. The trends and their roles as the avenues to the high-paying jobs would be very helpful also. What type of education do the employers prefer?

It would seem that it is time that data should be available to begin to make some comparisons between the products of different approaches. High Schools That Work and America's Choice would seem to be a good comparison to make, given the differences in orientation. (Don't forget the dropouts of the programs. One way to improve the outcome of the graduates is to increase the dropout rate.) Are there differences between these approaches in academic performance, high school graduation, college graduation, type of jobs sought and obtained, level of pay? If we are to propose one approach over another, it would seem that these data should be collected and published.

I agree that CTE is more than an approach to learning. If that is all that CTE is, then we can teach others to teach the way vocational educators have always taught, and thus eliminate the need for CTE.

Perhaps the best thing about this process of looking at the trends is the dialog concerning the directions that CTE should take. I look forward to more discussion

Sybil Kyi, Executive Director, Hawaii Workforce Development Council

September 11, 2001, was not only a catastrophic event for the U.S., it signaled the end of any isolation forever, and the beginning of really dealing with a global world. What does this mean for education, and particularly career and technical education? We have many hints of what it means already, but we haven't paid much attention, nor have we begun to respond to the changes. For example: Look at the professional and graduate programs in our universities, and who is in them. Look at the technology programs, and who is in them. Look at the skill competitions between countries, and who takes home the honors. Look at the kinds of jobs and skill mixes we have now, and what we lack. It resembles the fate of the Roman Empire, which "romanized" much of its world and, in the course of so doing, lost the capacity to produce anything itself, relying only on the outlying areas. Then there were the have's and the have-not's, and the rest, as they say, is history.

What kinds of responses should be considered to meet the needs of Americans in this brave new world?

1) Americans are abysmally ignorant about the rest of the world. Students are still fed too much of a Western worldview, to the exclusion of most of the rest of the world. Students in developed European and Asian countries learn two or three languages, and we have difficulty

with the one standard English! We continue to be a country of immigrants, but how well do we know these new groups if we live in the suburbs?

2) Students are made to feel they are secondary if they are not college prep; conversely, trades and technical workers don't get enough respect, although they often bring home more "bacon." A French observatory engineer once remarked that he advised the astronomers to only peer through the telescopes and leave the adjustment, maintenance, and repair to him, to prevent things going awry.

Second posting from Hollie Thomas, following that by Sybil Kyi

I think it is too early to know what the impact of 9/11 will be on CTE. However, it is time that we took a new look at where we are in relation to academic education. The current emphasis on academics may be important—but we have increased our college graduation by only 2.5% between 1963 and now (20% in 1963, and 22.5% currently). During this same period, high school graduation has gone down 5%. Yes, it would be good for all of our high school graduates to learn two or three languages. But isn't it more important to learn skills that will be useful in the workplace? I think it is time for CTE leaders to seize the moment to bring our programs into the 21st century, and regain respect for what we do.

Andy Rezin, Administrator, Automotive & Applied Technologies, Columbus State Community College

Based on recent experience, it does not seem to matter as much which of the "implementation methodologies of Career and Technical Education" is used in an area, state, or region as is the underlying motivation that the individual system embraces. Many examples exist in Ohio, as well as across the nation, where HSTW, Tech Prep and Career Academies are "alive and well," working to enhance career preparation of students. In systems where the school administration, the community, and private industry work closely together and are committed to career preparation (e.g., The Oaks in Greater Cincinnati), these methodologies are helping to provide graduates who are academically better prepared for lifelong learning AND have higher levels of workplace knowledge and skills.

In contrast, school systems whose true commitment to career and technical education is a "bit more questionable" have used both Tech Prep and Career Academies to increase the concentration on academics while dramatically REDUCING the quality and quantity of career-specific training and education. Career clusters, career academies, and Tech Prep "methodologies" can and are being used by some school systems to justify a shift in educational focus toward enhanced academics INSTEAD of enhanced career and technical skills, whereas their original intent was the enhancement of both. Each of these methodologies is part of a "toolset" for providing a variety of delivery methods to enhance the knowledge and skills that the high-tech workforce of today and tomorrow will require.

The foundational problem with career and technical education lies at a more basic level that cannot be fixed by giving vocational education or implementation strategies new names. It

requires that school systems understand, acknowledge, and embrace the realities of our citizens, our workforce, and our economy. This necessitates the enhancement of academic AND technical skills to prepare America's future workers for our high-tech global economy. If we (educators) choose to hold onto the elitist philosophy of higher education INSTEAD of higher skills for the American learner, we will be the fundamental cause of the economic undoing of our nation.

Conference Call Summary

As in the on-line discussion, the participants in the conference spent relatively little time discussing the demographic, economic, and technological trends shaping the environment for education. Instead, they focused on changes in CTE—especially changes at the secondary level. The three participants represented diverse viewpoints: Larry Nelson is the acting state director for South Dakota, Dave Melgaard is a teacher educator from North Dakota, and Joan Wilkosz is a former administrator, now consultant, for the Minneapolis Public Schools. Chris Bremer, field liaison for the University of Minnesota, facilitated the discussion with Jane Plihal, Site Director for the University of Minnesota, serving as a resource.

The first issue raised was the new vocationalism and the ways in which it differs from traditional vocational education and Tech Prep. The participants thought that there is not much "new" in the philosophy of the new vocationalism, but they recognized that practice has not always reflected this approach. Often it has been more education *for*, rather than education *through*, occupations.

There was general agreement that secondary CTE programs in their three states are becoming broader. There are several educational reform initiatives with differing emphases, however, and these can lead to lack of focus. Ms. Wilkosz mentioned four of the reforms that different Minneapolis schools have tried to implement: New American High Schools, Coalition of Essential Schools, School-to-Work, and Tech Prep. All of these try to strengthen the academic core, but they have had limited success in integrating CTE and academics. Better information on effects of the different initiatives would help schools to select the approaches that offer the most potential for their circumstances.

South Dakota and Minnesota have been emphasizing increased integration of academic and CTE. All of the CTE programs in South Dakota have been crosswalked against the state's academic learning standards. This has highlighted the amount of academic content in CTE. A unified state plan for secondary and postsecondary education has been the driving force in Minnesota. The state has adopted standards designed to prepare high school graduates for both careers and postsecondary education. The performance indicators for CTE programs are based upon these standards.

The participants agreed that broader secondary programs have led to increased articulation between secondary and postsecondary education in their states. Dual enrollment programs are offered in all three. The unified plan for Minnesota requires articulation. The two-year institutions in that state are seeing increased enrollments of students who took career clusters in high school. South Dakota has more than 250 Tech Prep articulation agreements between high

schools and technical institutions. These institutions support strong secondary CTE programs because they serve as feeders to postsecondary. Articulation agreements have also led to increased postsecondary enrollments in North Dakota.

Of the alternative futures possible for CTE, the conference call participants see increased integration of academics with CTE, and enhanced articulation, as the most likely. Educational reform—most visible as higher academic standards—requires more emphasis and integration of academic content. The participants also anticipate more transfer of credits among levels—high school to two-year technical, and two-year to four-year baccalaureate. Dave Melgaard noted that his institution is developing a bachelor's degree that will give full credit to two-year technical programs.

There were some comments that differ from the points made in the environmental scan. One of the major demographic trends influencing Minneapolis is the increase in students from immigrant families. This impacts the whole school system, including CTE. The paper takes the position that immigration has little effect on CTE.

In contrast to the increase in secondary students projected in the environmental scan, in the Dakotas, student populations are declining. In South Dakota, this decline, together with a policy change that combined CTE dollars with general education funding, has led to cuts in CTE programs. The sparse populations in the two states are driving education toward more cooperation, which may include consolidation, and distance education through the Internet and interactive video. South Dakota claims its schools are the "most-wired" in the nation. Minnesota has also experienced funding cuts.

One of the omissions in the environmental scan noted by the participants was the role of CTE in economic development. Larry Brown, speaking from the perspective of a state director, sees traditional vocational education, i.e., occupationally specific skill training, as critical to workforce development, which, in turn, is critical to economic development. He rejected the idea that CTE should be only an instructional method. In his judgment, most of the high schools in South Dakota are too small to offer career academies, but can offer technical education in specific occupations.

With these exceptions, the participants felt that the paper had identified major influences and their likely impacts on CTE. For me [Morgan Lewis], the author of the environmental scan, the discussion reinforced the conclusion I offered in the paper: the directions that CTE will take in the remainder of the decade will be determined primarily by decisions made at the state and local levels. Broad forces in the environment do not cause the future. The future is created by the decisions individuals make as they respond to these forces and attempt to meet the needs of those they serve.

CHAPTER 5: RECURRING THEMES

This chapter provides an overview of the major issues and concerns that the various sources, examined in the preceding chapters, identified as confronting Career and Technical Education (CTE). These sources are diverse, with representation from associations and institutions at the national, state, and local levels, and with individuals whose responsibilities include administration, instruction, professional development, policy research, and advocacy. The focus groups that the directors of the two National Centers conducted with leaders of CTE gave somewhat heavier weighting among these sources to state-level administration. With that exception, the representation from local teachers and administrators, teacher educators, and others concerned about CTE—business, labor, and tribal/racial/ethnic spokespersons—was approximately equal.

The diversity in sources did not produce a comparable diversity in concerns. Instead, there was a fairly high level of consensus, especially at the secondary level where one issue dominated: In the current context of educational reform, with high standards and expectations for all students, what should be the role of CTE? Educational reform is pushing CTE to broaden its programs and to strengthen the academic skills of its students. The current federal legislation reinforces the emphasis on academics, but also requires among its core indicators: "Student attainment of challenging State-established…vocational and technical skill proficiencies," and "…a proficiency credential in conjunction with a secondary school diploma" (P.L. 105–332, Sec 113). A proficiency credential implies mastery of knowledge and skills in a defined occupation, or set of occupations with similar requirements.

Much of the discussion in the conference calls, in the session with the National Centers' Advisory Council, in the focus groups with key state secondary leaders, and in the reactions to the environmental scan paper, addressed these many pressures on the field. No one objected to the broadening of secondary programs. Participants in these various forums perceive CTE as preparing its students for both employment *and* further education. They want to move away from classifying students as college- and non-college-bound. They feel their programs give students the backgrounds they need to enter employment, pursue further education, or do both.

Differences arise over the best ways to structure programs to achieve these multiple objectives. The debate centers on the degree to which secondary programs should stress occupationally specific skills. Some see these skills as the core of the field—the content that provides context and relevancy for engaging students in learning. Mike Rush, the director of professional and technical education in Idaho, argued this position most forcefully in his reaction to the environmental scan (see pages 48–50). Much of the discussion in the focus group with key leaders (pages 20–23), and many of the individuals who posted comments to the CAREERTECH discussion of high-stakes testing (pages 25–27), supported this position.

The advocates of a broader approach see occupational content as a means of achieving general education goals. They argue that the high school cannot adequately prepare for both employment and further education, and attempting to do so inherently tracks young people from disadvantaged circumstances into programs that limit their future opportunities. Some would like

to replace preparation for specific occupations with the study of broad clusters of occupations. A cluster provides the context for teaching the knowledge and skills required for a group of related occupations and for demonstrating the application and utility of communication and problem-solving skills. A health cluster, for example, exposes its students to occupations requiring all levels of preparation from short, intensive programs, e.g., licensed practical nurse, to medical residencies that require many years of post-college study. An understanding of how the human body operates is essential to all these occupations, so that becomes the focus of related communication, mathematics, and science instruction. The students are also exposed to skills required in all health occupations, such as aseptic techniques. (The outline for an introductory course to health occupations prepared by the Florida Department of Education: http://www.firn.edu/doe/dwdframe/ho/pdf/179999ex.pdf).

Much of the discussion of other needs of the field related to the implementation problems associated with offering broader forms of CTE. Professional development was a dominant concern in the conference calls that addressed general needs. Certification, including alternative certification, was the main theme of these discussions. Virtually all participants report that their states are having difficulties recruiting instructors for CTE. In some states, this has caused the requirements for alternative certification to be relaxed to the point that, in the judgment of some, they have little meaning. Participants from Arizona, Pennsylvania, and Virginia reported that their states have given superintendents of local districts so much discretion in the awarding of temporary (emergency) certificates, little participation in professional development is necessary.

The key state secondary leaders who met with the center directors noted the problem of finding teachers who can teach cluster courses. The typical instructors of trade and industry courses do not have bachelor's degrees. They are hired because of their knowledge of and experience in specific occupations. How can such instructors be prepared to teach broad occupational clusters? In almost all cases, such instructors are poorly prepared to teach the academic skills related to occupations. They need considerable assistance to integrate academics with technical instruction. Instructors want professional development that provides methods and materials that can be applied in individual classrooms. As one instructor put it, "Programs are sold and are of interest to administrators, but instructors are interested in lessons, not programs."

The postsecondary representatives in the various need sensing activities expressed few concerns about the role of their CTE programs. All accept occupational preparation as their primary purpose. Accountability was the main issue raised by the state leaders in their meetings with the national Center directors. The difficulties of collecting accountability data and the appropriateness of traditional measures, such as program completion, received considerable attention. Follow-up data on employment and earnings after leaving programs are two traditional measures. Such data are difficult to assemble, even if unemployment insurance wage records are available. In addition, many students do not take full programs. Instead, they take one or more classes to meet individual needs. Many of these students are employed while they are taking classes. What are appropriate outcome measures for these students?

The difficulties of recruiting qualified instructors and administrators are as acute at the postsecondary level as at the secondary. Increasingly, community colleges are using adjunct faculty who have regular jobs in the technical areas that they teach. Concerns were raised about the pedagogic skills of these instructors. If anything, the postsecondary level is experiencing even more difficulty finding administrators with a background in CTE than is the secondary level. One participant cited a projection that 1,000 community college presidents will retire in the near future. How will they be replaced? Who is providing the professional development for these future leaders?

Competition from on-line providers of educational services is another major concern at the postsecondary level. On-line delivery is growing, and local institutions are finding it hard to compete with well-known, national providers such as the University of Phoenix. The cost of developing on-line courses and merging them with existing programs has proved difficult. When all these difficulties have been overcome, many institutions find they have problems retaining students in on-line courses.

Another issue raised in the need sensing was how to increase the scope and effectiveness of dissemination activities. The responses from virtually all sources were highly consistent: provide the information as succinctly as possible, use electronic media, target state staff, and cooperate with other associations and organizations concerned with CTE to use their distribution systems, including conferences and meetings, to multiply the National Dissemination Center's efforts.

Overall, the need sensing conducted during 2001 largely confirmed and augmented the findings of the prior year. The extent to which various topics were emphasized varied somewhat, but no major needs were encountered that had not arisen previously. The different dimensions of professional development, pre-service, inservice, pedagogic skills, and credentialing received more emphasis in 2001 than in 2000. The need for a clearinghouse was mentioned less frequently in 2001. The work of the two National Centers in 2001 was heavily influenced by the results of the need sensing conducted in 2000. The results of the 2001 need sensing will be used to further focus these efforts.

REFERENCES

Beckner, L., Horn, L., & Clune, M. (2000). *Descriptive summary of 1995-96 beginning postsecondary students: Three years later.* (NCES 2000154). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. Retrieved June 3, 2001 from: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000154

Blank, W. (1999). Future perspectives in vocational education. In A. J. Pautler, Jr. (Ed.),*Workforce education: Issues for the new century*, 281–290. Ann Arbor, MI: Prakken.

Bragg , D. D. (2000). Editorial: Reflecting back, looking forward–Tech prep and integration of the past, present and future. *Journal of Vocational Education Research, 25*(3), 221–236.

Bragg, D. D. (2001a). Opportunities and challenges for the new vocationalism in American community colleges. In D. D. Bragg (Ed.) *The new vocationalism in community colleges: New directions for community colleges.* San Francisco: Jossey-Bass.

Bragg, D. D. (2001b). *Promising outcomes for tech prep participants in eight local consortia.* St. Paul: National Research Center for Career and Technical Education, University of Minnesota.

Commission on the Skills of the American Workforce. (1990). *America's choice: High skills or low wages.* Rochester, NY: National Center on Education and the Economy.

Dewey, J. (1913). An undemocratic proposal. In M. Lazerson & W. N. Grubb (Eds.). *American education and vocationalism: A documentary history 1870-1970*, 143–147. New York: Teachers College Press.

Education Commission of the States. (1999). *Future trends affecting education.* Denver, CO: Author.

Flynn, P. M. (1988). *Facilitating technological change: The human resource challenge.* Cambridge, MA: Ballinger.

Fullerton, H. N., Jr., & Toossi, M. (2001). Labor force projections to 2010: Steady growth and changing composition. *Monthly Labor Review, 124*(11), 21–38. Retrieved November 5, 2001 from: www.bls.gov/opub/mlr/2001/11/art2full.pdf

Gray, K. (1999). *High school vocational education: Facing an uncertain future.* In A. J. Pautler, Jr. (Ed.), 159–170.

Grubb, W. N. (1996). The new vocationalism: What it is, what it could be. *Phi Delta Kappan, 77*(8), 535–546.

Heaney, T. (1995). *Issues in Freirearn pedagogy*. Retrieved May 24, 2001 from: http://nlu.nl.edu/ace/Resources/Documents/FreireIssues. html

Hecker, D. E. (2001). Occupational employment projections to 2010. *Monthly Labor Review, 124*(11), 57–84. Retrieved November 5, 2001 from: www.bls.gov/opub/mlr/2001/11/art4full.pdf

Kemple, J. J., and Snipes, J. C. (2000). *Career academies: Impacts on students' engagement and performance in high school*. New York: Manpower Demonstration Research Corporation. Retrieved June 3, 2001 from: www.mdrc.org/Reports2000/Career Academies/CA-ExSum-2-4-00.htm

Kerka, S. (2000). Career academies, *InBrief No 1*. Columbus: National Dissemination Center for Career and Technical Education, The Ohio State University.

Kim, K. & Creighton, S. (1999). *Participation in adult education in the United States: 1998-99*. Statistics in Brief. (NCES 2000027). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. Retrieved May 17, 2001 from: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000027

Lakes, R. D. (1997). *The new vocationalism: Deweyan, Marxists, and Freirean themes*. (Information Series No. 369). Columbus: ERIC Clearinghouse on Adult, Career, and Vocational Education, The Ohio State University.

Landow, G. P. (1992). Hypertext: The convergence of contemporary critical theory and technology (as quoted in S. Lubar, 1993). *Infoculture: The Smithsonian book of information age inventions*, 46. New York: Houghton Mifflin Company.

Levesque, K., Lauen, D., Teitelbaum, P., Alt, M., Librera, S., & Nelson, D. (2000). *Vocational education in the United States: Toward the year 2000*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Lewis, M. V. (2001). *Major needs of career and technical education in the year 2000: Views from the field*. Columbus: National Dissemination Center for Career and Technical Education, The Ohio State University. Retrieved June 23, 2001 from: http://www.ncctе.org/publications/infosynthesis/r&dreport/Major%20Needs%20of%20CTE.pdf)

Lewis, T. (1998). Vocational education as general education. *Curriculum Inquiry, 28*(3), 283–309.

Lubar, S. (1993). *Infoculture: The Smithsonian book of information age inventions*, 46. New York: Houghton Mifflin.

Lynch, R. L. (2000a). High school career and technical education for the first decade of the 21st century. *Journal of Vocational Education Research, 25*(2), 155–194.

Lynch, R. L. (2000b). *New directions for high school career and technical education in the 21st century.* (Information Series No. 38). Columbus: ERIC Clearinghouse on Adult, Career, and Vocational Education, Center on Education and Training for Employment, The Ohio State University.

Miller, M. D., & Gregson, J. A. (1999). *A philosophic view for seeing the past of vocational education and envisioning the future of workforce education: Pragmatism revisited.* In A. J. Pautler, Jr., (Ed.), 21–34.

Morrison, J. L. (1985). Establishing an environmental scanning process. *New Directions for Higher Education, 49*, 31–37.

Muncey, E. & McQuillan, P. (1996). *Reform and resistance in schools and classrooms.* New Haven, CT: Yale University Press.

National Center for Health Statistics. (2001). *Vital statistics of the United States, 1997* (Volume 1, Natality, Third release of files). Retrieved June 15, 2001 from: http://www.cdc.gov/nchs/datawh/statab/unpubd/natality/natab97.htm

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform.* Washington, DC: Government Printing Office.

Organisation for Economic Co-operation and Development. (1999a). *Education: New economy, new challenges?* Paris: Author. Retrieved July 9, 2001 from: http://www.oecd.org/sge/au/Highlights19.htm

Organisation for Economic Co-operation and Development. (1999b). *The future of the global economy: Towards a long boom?* Paris: Author. Retrieved July 9, 2001 from: http//www.oecd.org/sge/au/Future of the globaleconomy19.htm

Parnell, D. (1985). *The neglected majority.* Washington, DC: Community College Press.

Pautler, A. J., Jr. (Ed.). (1990). *Vocational education in the 1990s.* Ann Arbor, MI: Prakken.

Pautler, A. J., Jr. (Ed.). (1999). *Workforce education: Issues for the new century.* Ann Arbor, MI: Tech Directors Books, Prakken.

Pucel, D. J. (1999). Curriculum issues. In A. J. Pautler, Jr., (Ed.), 211–222.

Su, B. W. (2001). The U.S. economy to 2010. *Monthly Labor Review, 124*(11), 3–20. Retrieved November 7, 2001 from: http://www.bls.gov/opub/mlr/2001/11/art1full.pdf

Second International Congress on Technical and Vocational Education. (1999). *Technical and vocational education and training: A vision for the twenty-first century*. Paris: UNESCO.

Snyder, T. D., & Hoffman, C. M. (2001). Table 38. Historical Summary of public elementary and secondary school statistics: 1869–70 to 1997–98. *Digest of educational statistics: 2000*. (NCES 2001-034). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Stringfield, S., Millsap, M. Herman, R., Yoder, N. Brigham, N., Nesselrodt, P., et al. (1997). *Special strategies studies final report*, 48. Washington, DC: U.S. Department of Education.

Toffler, A. (1980). *The third wave*. New York: Morrow.

Tucker, M. S. (1999). How did we get here and where should we be going? In D. D. Marsh & J. B. Codding (Eds.), *The new American high school*, 18–34. Thousand Oaks, CA: Corwin.

U.S. Census Bureau, (2000). No. 1. Population and area: 1790–1990. *Statistical abstract of the United States, 2000*. (120th edition), 7. Washington, DC: Government Printing Office.

U.S. Department of Commerce, U.S. Department of Education, U.S. Department of Labor, National Institute for Literacy, & U.S. Small Business Administration. (1999). *21st century skills for 21st century jobs*. Washington, DC: Government Printing Office.

Walter, R. A., & Farmer, E. I. (1999). *Postsecondary workforce education*. In A. J. Pautler, Jr., (Ed.), 171–180.

Witkin, B. R. & Altschuld, J. W. (1995). *Planning and conducting needs assessment: A practical guide*. Thousand Oaks, CA: Sage.

APPENDIX A:

STATES ASSIGNED TO CONSORTIUM INSTITUTIONS

Region 1, The Pennsylvania State University, Edgar Farmer, <eif1@psu.edu> Site Director; Ferman Moody, fermanbmoody@aol.com> Field Liaison

Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, Virginia

Region 2, The Ohio State University, N. L. McCaslin, <mccaslin.2@osu.edu> Site Director; Brian Sandford, <sandford.6@osu.edu> Field Liaison

Alabama, Florida, Georgia, Kentucky, Mississippi, Ohio, South Carolina, Tennessee, West Virginia, Puerto Rico, Virgin Islands

Region 3, University of Illinois, Debra Bragg, d-bragg1@uiuc.edu Site Director (through 2001); Craig Mueller, camuelle@uiuc.edu, and James E. Bartlett, II, Field Liaisons

Arkansas, Illinois, Indiana, Louisiana, Michigan, Missouri, Oklahoma, Texas, Wisconsin

Region 4, University of Minnesota, Jane Plihal <pliha001@tc.umn.edu> Site Director; Chris Bremer <breme006@tc.umn.edu> Field Liaison

Colorado, Iowa, Kansas, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Wyoming

Region 5, Oregon State University, Wayne Haverson, <haversonw@orst.edu> Site Director; Valerie Lau, <valerie.lau@orst.edu > Field Liaison

Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, Washington

APPENDIX B:

SUMMARIES OF FOCUS GROUPS WITH KEY STATE SECONDARY AND POSTSECONDARY OCCUPATIONAL EDUCATION LEADERS

Career and Technical Education Key State Secondary Leaders
Hyatt Regency St. Louis
Thursday, May 10, 2001

Trends and Issues in Career and Technical Education Programs

1. Place of CTE in school reform
2. Contributions of CTE in high-stakes testing
3. Role of career academies in improving student achievement and reducing dropout rates.
4. Role of career academies in school reform
5. Career clusters - implications for secondary and postsecondary CTE
   - bridging between secondary and postsecondary
   - curriculum
   - teacher education
6. Tension between job-specific and broad-based CTE programs
7. Value of certificates, diplomas, industry certifications (Associate Degrees: AAT, AAS, AS, AA)
   - meeting employer needs and continuing educational requirements
   - seamless
   - what is good
8. Dual enrollment
   - secondary/postsecondary—status, processes, results
   - seamless effort—how
9. Relationships/connections of secondary and postsecondary CTE with various other initiatives—WIA, etc.
10. Technical assistance system for low-performing CTE schools/programs
    - use of data
    - instruments
    - teams

11. What constitutes effective CTE programs
12. How to best teach the broad generic terms
13. How to design and deliver a curriculum to meet the needs for employment and further education
    - all levels
14. Recruitment and retention of teachers and administrators
15. Recruitment—spec. populations and non-traditional careers
16. Electronic delivery of continuous/sustained professional development for teachers/ administrators
    - multiple resources and how to use
17. Dealing with backlash of certain STW concepts
    - for all students
18. Non-traditional enrollments and completions
    - strategies and opportunities
19. Understanding diversity
20. Evaluating CTE accurately and objectively
21. Relevance/legitimacy of academic measures applied to CTE effectiveness
22. Clear definition/understanding of what CTE is
23. Development and delivery of a national curriculum for tech prep - for clusters/CTE areas
    - specific monitoring for CTE—local
    - providing help and support for improving school
    - system for improving student achievement
24. New and improved assessment system (explain how to use technology)
25. Types of data being collected (Perkins)
    - analyzing the data
    - interpreting the data
    - need for external viewpoint

26. "Narrow" "Perkins" view of ALL CTE in USA
27. Legitimacy of applied learning
28. Teacher preparation

Potential Research Initiatives

1. Trends in non-traditional enrollment
2. Educational/skill requirements of future workers
   - timely
3. What type of postsecondary education works?
   - salaries
   - placement
   - further education
4. Identification of mathematical constructions underlying career clusters
5. Role of work-based learning—value
6. Theoretical underpinnings for clusters
7. Worth of work
8. Challenging project-based learning activities (synthesis paper)
   - does it work?
9. Research to advocate for CTE
   - CTE is a valuable public investment
   - student retention
   - academic performance
   - get job
   - transfer to postsecondary
   - examples of success
   - CTE public development benefits—Federal, State levels

10. Effectiveness of on-line courses/programs
11. Teacher supply/demand

Potential Dissemination—Professional Development Activities

1. Quick source of information
   - Education Digest
   - bullet points
   - key areas
   - annotated bib.
2. Electronic newsletter
3. Information highway
   - satellite
   - webcast
4. Use existing conferences
   - State Directors
   - SREB
   - NASSP - CSSO
   - Student organization meetings
5. Use state meetings
6. Key leaders
   - government
   - state superintendents
   - local voc ed administrators
7. Packets—information at state conference
8. Timely translation
9. Products oriented to users

10. Advocacy—policymakers to see and understand data—live examples
11. "One pagers," "bullet points" for busy people
12. Policymakers—need to see "close to home" good examples
13. Modules oriented to technology for CT teacher education
14. "Things" that work
15. Effective methods of integrating academic content
16. Focus on state staff and local administration and professional organization/CT teacher education
17. Work with subject matter areas
18. Conference call with state directors
    - products out
    - discussion on a topic/requests

Meeting Participants

Alfredo Acevedo
June Atkinson
Robert Brems
Sandy Dunkle
Charles Hopkins
Floyd McKinney
Mike Rush
Jean Stevens

Community College Key Leaders Meeting
Hyatt Regency St. Louis
May 11, 2001

Issues

Competition—packaging and designing instruction to compete with employers and others

- CC packaging is traditional
  - Communication
  - Design

E-Learning

- Competition
- Building curriculum
- Delivering curriculum and managing
  - Lack of funds for development
- How to fit into a traditional environment

Credentialing and Certification

- How do people have foundation skills for future learning
- Certifying soft skills

Identification of best practices for all levels of learners

Accountability issues

- What do Community Colleges do for people who participate in community college programs?
- Chunks of learning—need to be recognized and counted
- How do incumbent students use community colleges?
- Community college impact on incumbent workers

What is an incumbent worker?

- Individual takes a course and leaves
- Employer—group

Community College organizations to meet needs of various groups—workforce training

- Need to brand and blend
- Emerging
- Transition
- Entrepreneur
- Incumbent
- (job changes, welfare, older Americans, designing and delivering programs)

Workforce training and how it connects to WIA
- Community colleges do inadequate packaging/marketing of programs
- C.C. have difficulty knowing where they are—hard to know how to improve
- WIA data collections drive much of program data collection
- Who is the appropriate decisionmaker regarding what programs are needed and what are "good" occupation programs

Performance gap among various socio-economic groups

Taking all students thru appropriate development programs
- Do this differently for different types of students
- Disseminate information about best practices

Working with secondary programs

Working with language barriers

Measuring success level with diverse clientele—what are the criteria for success with various groups
- What are the goals
- What is the curriculum
- How to measure

Assessing worker skills
- Skill assessment and certification

Apprenticeship
- New model
- Comparative
- Europe

Currency
- Starting new programs
  - Cap. Equip
- Evaluation against industry standards
- Constant—continuous

Leadership
- Development of change agents
- Opportunity for developing leaders
- Spotty programs
  - EPDA programs
  - Institute programs

Interpreting Business Needs

- Do they know what they want
- Who is listening at C.C.—are they qualified
- Who gets assigned at C.C. to design and deliver
- How to share info

Lack of national focus in workforce issues

- States are driving local actions
- Have a number of players
  - Councils
  - Jr. Programs
  - Commissions
  - Etc.
  - (No national forum – no leadership)
- Who drives national priorities
- Research is not focused
- Terminology is different
- Need to identify players and set an agenda
- More to an agenda for workforce development

Transfer and articulation: two–four years

- Corrections education
- Definitional issues
- When is appropriate time for career—specific preparation to begin—when and where to deliver

Research

Are under-prepared students being served well by community college

E-Learning

- Architecture to select
- Potential for regular curriculum development
- What does distance learning mean in occupational ed.

Definition, need, best practices around for major segments of workforce and development

Managing learning

- Use of technology—enhancing learning
- What can be taught using technology and what cannot

How is developmental education appropriate for occupational education—When? How?

Identify completer (student goals)
- Mechanism for identifying data
- Caution—legitimizing various entities providing various programs

What delivery models work best?

Do participants in JTPA, WIA, etc., continue their training? As compared to participants in programs offered by other entities

Review and synthesis of research in C.C. occupational education

What is the status of research in C.C. occupational education

How to communicate with important audiences

Dissemination—professional development

Integrate with other organizations and conferences

Linking with other AACC programs
- WDI
- NCCET
- NCOE
- AACC
- State, Regional
- NCIA
- Tech Prep
- Workforce Liaison
- Dept. of Labor

Identify reliable source in each state
- Get from State Presidents organization

National Association of Advanced Technology Center

NETWORK

Professional development (national basis) for faculty – by discipline
- Also leadership
- Advisory group

C.C. council for staff development

Work with University and others engaged in leadership/professional development activities

- Consider convening meeting

National Council for Professional Development (NCS P&D)

Consider pre-conference workshop

Work with intermediate district

Keep it brief

KEY STATE SECONDARY LEADERS
SCOTTSDALE, AZ
Monday, September 10, 2001

Participants: Phyllis Dryden, Milton Ericksen, Steve Franks, Marilee Johnson, Ed King, and Arlene H. Parisot

Facilitators: Charles Hopkins and Floyd McKinney

Cutting-Edge Trends and Issues in Career and Technical Education Programs

The group identified the following issues and trends. (Rank order of importance was not determined.)

Industry Certification

How many certifications are needed?

Should there be similarity of certifications across the country?

What certifications are appropriate for secondary and for postsecondary?

How can a program transformation be managed to accommodate certifications?

How do certifications impact the awarding and value of degrees?

How do you determine what constitutes a qualified teacher? What should be the requirements for a certified teacher? Should CTE teachers be expected to hold industry certification?

How do you design a system in the secondary schools that uses clusters, skills, standards, and industry certifications?

Clusters

How to collect student-level data when moving away from programs to clusters?

Where are the appropriate curriculum materials to use at the secondary and postsecondary levels?

Concern was expressed that if secondary programs are required to implement the cluster concept, there would no longer be a secondary career and technical education.

Where can teachers be found to teach the broad-based clusters? Industry personnel tend to be experts in specific areas, not in broad-based clusters.

Cluster concepts are easier to deliver in career academies. How do we bring a cluster system into the comprehensive secondary school system? How do we build the system? What would the system look like?

Use of Adjunct Faculty

How can adjunct faculty be kept engaged in accountability, professional development, and program development?

Basis for Funding Secondary and Postsecondary Career and Technical Education

What should be the basis for funding career and technical education programs?

Seat time?

Student performance?

Work-based learning?

Other?

Assessment

There is a need for performance-based authentic assessment in career and technical education. How can authentic assessment be done for a reasonable cost?

How does career and technical education enhance academic learning?

How can career and technical educators impact policy decisions concerning assessment at the national level?

Contextual Teaching and Learning

What are the impacts of contextual teaching approaches on student learning?

Countering Mis-Information

How can career and technical educators effectively inform policymakers at all levels of the facts concerning career and technical education programs and their outcomes?

Equity and Adequacy Issues

What is an adequate high school education? Does/should it include CTE?

How can career and technical education be positioned at the secondary level so as not to be negatively impacted regarding the difficulty states are having in ensuring equity and adequacy of educational programs?

Distance Learning

Hardware issues

Program/curriculum issues

Role and processes for implementing and conducting distance learning programs

Use across state lines

College/University Admission Requirements

What is the impact on career and technical education programs of colleges/universities increasing academic admission requirements?

Tech Prep

How can horizontal articulation be enhanced?

There is a need for impact data—what difference does tech prep make?

How can articulation across academic and technical areas be enhanced?

Image of Career and Technical Education

What works to improve the image of career and technical education?

ADDITIONAL RESEARCH QUESTIONS

What strategies would be effective to get CEOs to value career and technical education?

What strategies would be effective to help policymakers understand the importance of career and technical education?

What are the characteristics of the knowledge worker?

How could the Centers partner with states to conduct research relevant to the states?

SUGGESTIONS FOR DISSEMINATION AND PROFESSIONAL DEVELOPMENT

Focus the delivery of research-based information to state-level personnel.

Make extensive use of short (one or two pages) information pieces that deliver the essential information in bullet points.

Make more extensive use of an electronic newsletter.

Schedule 2–3 day meetings attached to a meeting OVAE is mandating for state directors/staff. Use this meeting to provide research-based information to state staff members so that they can share it with their local program personnel.

Make more extensive use of webcasts to deliver research-based information to state directors and their staff members.

Develop a comprehensive and frequent electronic newsletter that state staff members can forward to appropriate individuals in their state.

Career and technical teacher education is an extremely critical area. Continue to sponsor an annual conference.

Community College Occupational Education Key Leaders Meeting
Scottsdale, AZ
Tuesday, September 11, 2001

Participants: Joan Barrett, Susan Clifford, Homer Hayes, Cynthia Heelan, Myrtle Mitchell, and Mary Vanis

Facilitators: Charles R. Hopkins and Floyd L. McKinney

Trends and Issues in Career and Technical Education Programs

- Use of Unemployment Wage Information data for benchmarking and national comparison purposes is difficult because access, timelines, and data vary by state (access often determined by Attorney General)
- Tracking students is complex and difficult because of data-reporting-system inadequacies
  - < Data are difficult to collect
  - < Sorting and interpreting data is problematic
    CIP codes are not pristine – employer specification not always accurate
    - # Data is gross—not finite
    - # Variability of data across states
- Vertical Integration
  - < Initiatives are lacking
  - < Lack of interaction between K–12 and postsecondary with postsecondary
  - < Diminished emphasis on CTE at secondary level is affecting enrollment in postsecondary
  - < Unprepared students from K–12 affect community college efforts
    - # Large part of budget goes to remediation
- Image continues to be an issue
  - < Parents, counselors still react negatively to 2-year occupational programs as compared to 4-year programs
  - < Inadequate recognition of value of Community College programs
  - < Need good career guidance and counseling
  - < Informing the public of the need and importance of two-year college participation is becoming increasingly important
- Role/focus/purpose of secondary CTE needs to be clarified
  - < Funding limits K–12 participation in Community College programs until they can no longer receive money for the student

Potential Research and Dissemination Initiatives

- What are the young people doing who do not enroll in postsecondary education
- Male enrollment in postsecondary education is declining
- Need to identify and share models of success
- Develop strategies for partnering and linking among organizations and with business and industry
- Collect data on entry and progression of two-year college vs. four-year completers. Information would help with image problem.
- Need for systematic structure in a program so that there are concrete pathways and outcomes – do we have research-based information to validate the program
- Professional development of administration and faculty in CTE
  - < Needs assessment and research skills are important
  - < Need for improving instructional skills in Community Colleges
    - # Using technology
    - # Electronic education delivery
      - Planning
      - Implementation
      - Crossing state lines, costs, ownership
    - # Merging academic and technical education
  - < Use of data to move programs to exemplary levels
- Where will people come from to teach
- Replacing 1,000 retiring first-time Community College Presidents will be a challenge
  - < Similar problem for other administration and faculty
- Need for new leadership skills
- How to change thinking about traditional pathways
  - < 25% of community college students have bachelor's degrees; they then go to community college/technical college
  - < Need a study of reverse transfer
- Who is the competition? What are they doing?
  - < e.g., University of Phoenix
  - < Delivery of instruction
  - < Impact of corporate learning enterprise

- Packaging programs so students can market themselves
  - < Continuing updating of worker competence
  - < Documentation of soft-skills
- Demographic shifts (underrepresented populations/lack of diversity in worker pools)—How are they changing program needs?
- How do we maintain a visible technology infrastructure
- Need a study to determine the relative worth of apprenticeships vs. internships vs. unrelated work experience
- What is the value-added for involvement with business and industry
- What are the effective strategies for maintaining highly motivated learners in e-learning (low retention for many C.C. e-learning offerings)
- How can community colleges effectively link with WIA
  - < Need to identify gaps (e.g., career exploration)
- Financing and reporting customized training activities
- Credentialing
  - < Learning is frequently not reflected on transcript
  - < Funding issues related to non-credit education
  - < Financing training for incumbent workers
  - < System should focus on competence, not credit

APPENDIX C: TOPICS DISCUSSED ON CAREERTECH LISTSERV

This appendix presents samples of postings to the CAREERTECH listserv that were part of substantive discussions. That is, the postings provided information or a personal opinion on a topic with a supporting rationale. This excluded postings that simply asked for further clarification/information, or indicated agreement or disagreement without explaining why. For those postings that are quoted, the name of the contributor and date of posting are provided. If anyone wishes to read the original postings, they are available in the CAREERTECH archives. The instructions for accessing the archives are presented as the last part of this section.

Percent Obtaining Degrees

In early January, a discussion continued for one week on the percentage of students who obtain degrees. Several of the postings provided references to sources. One response cited the following statistics for Indiana. The year of the data was not reported. [Percentages added by author of this report.]

> 80,000 students start first grade
> 61,000 finish high school (76% of those starting first grade)
> 32,000 start college (40% of those starting first grade, 52% of those finishing high school)
> 12,000 get a 2- or 4-year degree (15% of those starting first grade, 38% of those starting college) (Jon Groth 1-4-01)

Another cited figures from the Michigan Occupational Information System (MOIS), showing the following numbers:

> For every 100 students in grade 5—
> 99 will enter grade 9
> 88 will enter grade 11
> 76 will graduate from high school
> 47 will enter college
> 24 will earn a bachelor's degree

The listed source for these numbers is the National Center for Educational Statistics, and presumably they are national data. Once again, no year was reported. (Stephan Nason 1-8-01)

Literacy Testing of CTE Teachers

An inquiry about states that require literacy, not technical skills, testing of CTE instructors, yielded responses from several states as well as from Canada, Finland, and the United Kingdom. The person who initiated the discussion, Katherine Dubrovsky, compiled a report and offered it to anyone who is interested. To request a copy, contact Ms. Dubrovsky at <kdubrovsky@minuteman.org.>

High-stakes testing

The following posting on the effect of high-stakes testing led to a discussion concerning the need for higher-level academic skills for all students and the role of CTE in teaching such skills.

> I teach the low-level math, and see the Virginia SOL [Standards of Learning] comprehensive tests (determine if they really pass the class) to be forcing more and more to either drop out or go for a GED. My county now has a waiting list for the GED and gives a pre-test to determine who enters the class. (George Bond II 5-15-01).

Kathy Shibley (5-15-01) responded to Mr. Bond's comments as follows:

> The best use of career-technical education is within the context of higher academic standards whereby hands-on, real-world-based education becomes the context for learning math, English, social studies, and science, as well as a work-related skill. Without this integration, students who learn best using the career-technical methodologies are "tracked" without benefit of the academic skills they need to pursue postsecondary education/training. Many students now lost within the current system are capable of pursuing higher education—they should not be excluded from that option by being tracked for technical training only. The student who at 16 is interested in and skilled at working with automobiles can begin by learning auto mechanic skills, but should also be laying the groundwork for future choices that might include engineering or business ownership.
>
> Old assumption: academics and career-technical education are two dichotomous choices. New assumption: academics and career-technical education are an integrated whole that addresses both content and methodology for teaching/learning.

Another contributor noted the frustration he has encountered in the public schools, and recommended creating charter schools to prepare young people for careers. "We are focused on the development of charter schools and private postsecondary schools designed to prepare our kids to be successful in our working society." (James O'Malley 5-15-01)

"If testing is not expanded to include demonstrations, portfolios, and other tangible applications of knowledge, it will only continue to measure who is good at test-taking, regardless of the subject matter." (Barbara Tavares 5-15-01).

"Career-technical programs are designed to meet the needs of business and industry. Your students without academic skills will not be welcome, because they won't be able to acquire high-level technical skills without good academics. Business and industry are not interested in non-academic students." (Bob Sommers 5-15-01)

"We have discovered for one hundred years that teaching vocational skills is the best methodology for teaching academics to many students." (Jon Groth 5-16-01)

A posting from Scotland noted the difficulties experienced in school by children who receive little or no parental support for their education:

> ...our young people come from areas of high unemployment, as do their parents (third generation). The surveys had shown that the parents were not motivating the kids to go to school, which has caused these problems in the areas of core skills of communication, reading and writing, problem solving, etc. Most of our youngsters are involved in drugs also, as their parent or parents are educating them in this by not working and taking drugs themselves. (Iris Robertson 5-16-01)

"'Education reform' must mean more than simply adding a 'schooling to employment' component to an already-existing K–12 education system. The total effort needed can be put into a proper perspective if we recognize that a real education reform effort must be a combination of two processes. These include (1) the career development process and (2) the teaching/learning process. The first and most basic criterion to use in evaluating this effort must be the extent to which application of this effort affects pupil academic achievement. Unless (a) teachers change their interactions with students and (b) pupil academic achievement increases, no real education reform has taken place. Without these kinds of changes, career development efforts by themselves will not result in education reform. (Ken Hoyt 5-16-01)

Bill Caldwell (5-18-01) provided a list of the reasons he sees as underlying the problems of low-performing students:

> Our political system is tweaking, not fixing our education problem. However, moving kids out of school at 16 is a step in exactly the wrong direction....
>
> The reasons behind the inadequacy of our education system to produce workers ready for the workplace are, in my opinion, seven-fold:
>
> First, too many of our parents, for a multitude of reasonable reasons, cannot provide the early education that kids need to be ready for entry into the education system.
>
> Second, the workplace has changed. Forty years ago, all you needed to get a good factory job was the ability to follow verbal instructions. Your job was repetitive and easy to learn. Today, companies are crying for workers who can think, solve problems, work as a team without supervision, etc.
>
> Third, there has always been what some writers call the "forgotten half." In Piagian terms, these are the kids who have difficulty dealing with abstract ideas. They have different learning styles and need more concrete examples of the ideas being presented.

> Fourth, during my research in small-business training practices, I had one owner tell me that his company has given potential employees the same entrance test for 30 years. Thirty years ago, 99% could pass the test; today only 60% can pass it. What has changed? Forty years ago, we didn't have so many alternatives to core academics in our curricula. Perhaps we need to get back to the basics and, with the paragraph above in mind, find ways of teaching it.
>
> Fifth, the students have changed. We have gone from a character-based learner to a graphically-based learner.
>
> Sixth, legislation is needed to re-establish discipline in the schools.
>
> Finally, our students, parents, and school system must come to understand that, for the foreseeable future, our economy only needs about 25% of its population operating at the professional level that requires a four-year college education. Pushing kids who really lack the skills they need to succeed in the professional world into four-year college programs is just wrong, and may even be cruel when the ultimate failures begin.

"While I don't believe that most 16-year-olds are ready for full-time employment, I do believe that high school completion should be competency-based, and that the senior year should be only career activities. Working with thousands of schools throughout the U.S., I find that most vocational instructors agree with George." (Kurt Morauer 5-18-01)

The individual who started the discussion summed up his response to the many posting he stimulated as follows:

> First, I am in favor of increased academics, but as a math teacher, I see students who for any variety of reasons—some translate exactly as mentioned in Scotland, some due to immigrating to this area with poor schooling in the home country, some with little if any parental support as single parent working two or more jobs, and some due to social promotions from middle school—have extreme difficulty with math. They need a calculator for simple problems, have trouble understanding the concept of equations, and have difficulty remembering anything. They will never go on to advanced academics, anyway!
>
> I am concerned about the low-performing student who, like the poor, will always be with us! By focusing only on the ones who succeed in school, at least in these highly urban suburban areas, we will be ignoring a large part of the school population. I would rather have them be successful in some job, some career, rather than supporting them as wards of the state. (George Bond, II 5-16-01)

Terminology

On August 6, 2001, Ken Hoyt, former director of the Office of Career Education, U.S. Department of Education, responded to a posting that had categorized topics under the headings: "Career Education," "Career-Technical Education," and "Adult Education."

> The major concern I want to share here is that it will be impossible to either agree or disagree on whether each of the 10 sub-topics listed under "career-technical education" deserve to be included in the topic with that name until and unless there is some consensus-definition of the term "career-technical education." I have not yet seen any such definitions except those coming from persons who claim that the term "career-technical education" is simply a new name for what we used to call "vocational education." If that's all it is, we ought to say so and get on with our work.

Dr. Hoyt's comments prompted a detailed response by Joe Crowley (8-14-01), two paragraphs of which are quoted here:

> To summarize, career AWARENESS education is the term that should be used to define a program making students aware of the broad spectrum of occupations available to them. As an example, students can learn of the hundreds of technology-related occupations. Career PREPARATION education is the term for a program providing entry-level skill training specific to an occupation or close-knit group of occupations. Again, as an example, training for a network administrator. This technology example provides a segue into the second suggestion.
>
> Technology education suffers from the same confusion as career education. The term is used to describe unlike programs. It is used for training in what are normally construed as technologically related occupations—programmers, web page designers, computer and related equipment repair, etc. The problem with this definition is that "normally construed" confines technology to computer-related occupations. A quick perusal of the Dictionary of Occupational Titles will generate hundreds of examples of "technicians" who are not, directly, in the computer field—x-ray technicians, auto technicians, even food technicians. Thus the concept of preparing technicians through technology education is not a meaning conveyed by the currently accepted definitions of "tech ed."

These postings stimulated a prolonged discussion of terminology and the devaluation of the word "vocational" that raised again the issue that has been the most-discussed on the listserv: the emphasis our society places on the four-year degree. The many contributions were posted during August 2001, most with the subject line "Terminology." In November, similar themes were discussed concerning the number of jobs that will be created in coming years that will require a bachelor's degree.

Montgomery County Workgroup on CTE

The following posting did not lead to a substantive discussion, but it reflects the work of many people concerned about CTE in Montgomery County, MD. Montgomery County is primarily a suburb of Washington, DC, and is served by a large, well-respected countywide school district. Barry Burke, the Director of CTE for the district, posted this on July 19, 2001.

We convened a workgroup in September of last year (2000) and identified "findings" and developed "recommendations." I believe that you will see the "hot" issues that concern our group of parents, teachers, administrators, business community, and our superintendent. As I've spoken with others, we seem to be on the same "issue-list." As a result of the following list, we developed a 5-year strategic plan with approx. 35 initiatives to address the recommendations—including reorganizing & renaming CTE. Here they are:

Findings of the Steering Committee

Finding 1: Career and Technology Education (CTE) in Montgomery County is interpreted as "Vocational Education."

Finding 2: Programs in CTE are not perceived to be for "all" students.

Finding 3: While there are exceptional programs in CTE, there are gaps in how often each career development program is updated to industry standard.

Finding 4: CTE programs are the best-kept secret in Montgomery County.

Finding 5: Staff development often occurs in isolation of mathematics, science, English, and social studies.

Finding 6: CTE is an integrator of all subject matter and career counseling. Stronger ties to these areas are vital to student achievement and future success.

Finding 7: Students are being exposed to career concepts on a hit-and-miss basis across the county.

Finding 8: Career and college information is being disseminated inconsistently from school cluster to school cluster.

Finding 9: Studies show that there are links between student achievement and the ability for a student to see themselves in a future career.

Finding 10: Students are trained at an early age to think that college is the final destination after high school, rather than a means to a career.

Finding 11: Inaccurate or no information is routinely disseminated about career development programs.

Finding 12: Students are exposed very little to career concepts at an early age.

Finding 13: Teachers and counselors require industry experiences to stay current with practices and techniques that are being used in a career field.

Finding 14: Confusing terminology and availability of CTE resources often present obstacles to understanding and implementing CTE programs.

Finding 15: Teachers consider themselves isolated from their peers.

Finding 16: Many people do many of the same things, therefore there is no one point of contact for CTE/workplace resources.

Finding 17: A strong educational system that prepares workers with skills for success supports workforce development. The business community is keenly interested in student achievement and success.

Finding 18: CTE uses recognition of students and staff to celebrate success.

Finding 19: Workplace experiences help students make connections between school and goals for their future.

Recommendations of the Steering Committee

Recommendation 1: Design and implement a system-wide method for disseminating information that students, parents, teachers, administrators, and the business community can use to access accurate and timely data for career information, career exploration, and career development and decision-making.

Recommendation 2: Redesign, streamline, and focus the process for curriculum development for all CTE programs to include linking a comprehensive staff development initiative and workplace experiences to insure that all curricula are updated to reflect industry standards.

Recommendation 3: Engage students throughout their school years, with particular emphasis on students at an early age, to "see themselves" in their future.

Recommendation 4: Develop a marketing plan that involves all stakeholders to disseminate data about CTE programs, graduate data, and the value-added for CTE programs and students.

Recommendation 5: Evaluate and reorganize school and central-services-based assets for accountability and success related to those assets.

Recommendation 6: Expand the recognition and celebration of success of students and staff.

Recommendation 7: Change the name to clearly reflect programs and services that are supported by the division.

Recommendation 8: Expand opportunities for students to engage in the career development process through extended-day/extended-year programs.

To carry out Recommendation 1, a web page with information for students, parents, educators, and business has been developed. It is available at http://www.career-futures.net, "Helping All Children See Themselves in Their Futures!" To implement Recommendation 7, the name of the programs and services offered was changed to Career, College and Technology Studies.

Those desiring additional information about the work of the taskforce and changes made as a result of its recommendations can contact Mr. Burke at

850 Hungerford Drive, Rm. 269
Rockville, MD 20850
(P) 301-279-3567 (Fax) 301-279-3399
Barry_Burke@fc.mcps.k12.md.us

Accessing Archived Messages on CAREERTECH

Anyone interested in reviewing postings to the CAREERTECH listserv can access them by following the directions below, which were provided by Judy Wagner, the moderator of the listserv. On January 8, 2002, she posted these directions:

Send a message to: listproc@lists.acs.ohio-state.edu

In the body of the message: index careertech

Leave the subject line blank and turn off your signature block.

You will receive a message that looks something like

Archive: careertech (path: careertech) -- Files:
log0108 (1 part, 382767 bytes) --
log0109 (1 part, 63158 bytes) -- question
log0110 (1 part, 36555 bytes) -- NEw publications from ERIC/ACVE
log0111 (1 part, 146676 bytes) -- Note change in time for November 5th NDC Presentation
log0112 (1 part, 87023 bytes) -- Fwd: Press Release for December 3rd PDSS
log0201 (1 part, 13671 bytes) -- Fwd: January 10th PDSS Presentation

The log numbers refer to year and month (log0108 = the log for August of 2001)

Select the log you wish to retrieve.

APPENDIX D: NEED SENSING PARTICIPANTS

Region	Network	Post/Sec	State	LastName	FirstName
1	Admin/Inst	Post	DC	Holstead	Ronald
			NH	Grosz	Karen
		Sec	MD	Jones	Cheryl
			ME	Cassidy	Vinton
			ME	Gilbert	Charleyne (P)
			PA	Baker	MeeCee (P)
			PA	Fiumara	Fred
			PA	Sweetheimer	James (P)
			PA	Williams	Greg (P)
	Bus/Labor/Assoc		DC	Wilson	Michael
			MD	Anastassi	Robert (P)
			ME	Martin	Lisa
			NY	Mayo	Margareta (P)
			PA	Cullen	Jackie (P)
			PA	Hartwigsen	Frederick (P)
			VA	Kussman	Steven (P)
	Director Rep	Post	MA	Motta	Janice
			MD	Sumler	David
			ME	Crocker	Gary (P)
			NC	Rogers	Brenda (P)
			NH	Wisbey	Thomas (P)
			NJ	Nespolti	Larry (P)
			NY	Brown	Robert
			RI	White	Julie
			VA	Oliver	Arnold
			VT	Flies	Richard
		Sec	CT	Marcoux	Lee
			DC	Fredette	Judith
			DC	Torrence	Edward
			DE	Atkinson	Lewis
			MA	Kane	Francis
			MD	Gilli	Lynne (P)
			MD	Oliver	Katharine
			NC	Brannon	Don
			NH	Bos	Steve (P)
			NY	Stevens	Jean (P)
			RI	Cooley	Vanessa (P)
			VA	Brown	Kay
			VT	Stander	Charles
		Sec and Post	DC	Bell	Cynthia
			PA	Brown	John (P)
	Racial/Ethnic		ME	Sandborn	Mark
			NC	Hendrix-Frye	Helena (P)
			NC	Randolph	Willie (P)
			PA	Lufkin	Mimi
	Teacher Ed		DC	Belton	Cynthia
			ME	Bazinet	Greg
			PA	Eswin	Nancy
			PA	O'Brien	Tom (P)
			NY	Bukovan	Denise
			NY	Merrill	Herbert
			VA	Eschenmann	Kurt (P)

Region	*Network*	*Post/Sec*	*State*	*LastName*	*FirstName*
2	Admin/Inst	Post	AL	Haney	John
			FL	Brown	Mark
			GA	Collins	Dave
			KY	Wathen	Jim
			MS	Hooper	Mary
			OH	Rezin	Andrew (P)
			SC	Skubal	Jacqueline
			TN	Spohnholtz	Tom (P)
			WV	Thorne-Newcome	Beth (P)
		Sec	AL	Deaton	Dennis (P)
			FL	Jensen	Marianne
			GA	Rennie	Rhenida
			GA	Robinson	Marie
			KY	Bowles	Rhonda
			MS	Studham	James
			OH	Mastroianni	Sharon
			SC	Sloan	David (P)
			TN	Berry	Bronson
			WV	Webb	Carol (P)
	Bus/Labor/Assoc		AL	Fannon	Dave
			AL	Stringer	Eric
			FL	Ledford	Paul
			GA	Schelar	Scott
			KY	Barger	Steve
			MS	Thomas	Mike (P)
			MS	Walker	George
			WV	Mahoney	Tom (P)
			WV	Wyant	Laura
	Director Rep	Post	AL	Hughes	Matthew
			FL	Kiser	Sally (P)
			GA	Fredeking	Heather (P)
			KY	Wade	Charles (E)
			MS	Alley	Nancy
			OH	Taggart	Michael
			SC	Brandstadter	Dianne
			WV	Skidmore	James
		Sec	AL	Morrow	Gayle
			FL	Cordill	Nancy
			GA	Dohrman	Susan
			OH	Melvin	Vicki
			SC	O'Sullivan	Wofford (P)
			WV	Hopkins	Stanley
	Racial/Ethnic		AL	Merk	Jim (P)
			FL	Hays	Karen (P)
			GA	Smith	Danny
			KY	Fortson	Lawrence
			KY	Porter	Diane
			OH	Lawson	Howard
			SC	Glenn	Sherry (P)
			SC	Robertson	Jerry
			WV	Cary-Davis	Jean (P)
			WV	Faulkner	Susan (P)

Region	*Network*	*Post/Sec*	*State*	*LastName*	*FirstName*
2	Teacher Ed		AL	Marbut	Terry
			FL	Thomas	Hollie (P)
			GA	Smith	Clifton (P)
			KY	McNeary	Paul (P)
			MS	Deeds	Jacquelyn (P)
			OH	Berns	Robert (P)
			PR	Padilla	David
			SC	Dunlop	Nancy
			TN	Petty	Greg (P)
			WV	Gartin	Stacy
3	Admin/Inst	Post	IL	Marucco	Toni
			LA	Calloway	Kim
			MO	Owen	Karen
			OK	Patterson	Barbara (P)
			WI	Davis	Jim
		Sec	AR	Hays	Annette
			IL	White	Mike
			LA	Baxter	Linda
			MI	Dean	Jan
			MO	Knowles	Patricia
			OK	Allen	Bill (P)
			OK	Farquhar	Bruce
			WI	Wagner	Jane (P)
	Bus/Labor/Assoc		IL	Stromberg	Eldon
			LA	Reis	Cliff
			MI	Rosewarne	Anne
			MO	Allen	Neva (P)
			MO	Breshears	Ronald
			OK	Keen	Larry
			OK	Tucker	Robert
			WI	Peters	Diane (P)
	Director Rep	Post	IL	Lanning	Carol
			LA	Buck	Bob
			MO	Barnes	Terry
			MO	Wittstruck	John
			WI	Halloran	James
		Sec	AR	Aist	Gene
			AR	Davidson	John
			IL	Klut	John (P)
			IL	Parke	Scott
			IN	Fields	Terry
			IN	Stanley	Jeffrey
			LA	Husher	Sue
			MI	Miller	Mary
			MI	Stacy	Carole
			MO	Harden	Dennis
			OK	Ellibee	Margaret
			OK	Nagle	Martha (P)
			WI	Albrecht	Bryan

Region	*Network*	*Post/Sec*	*State*	*LastName*	*FirstName*
3	Racial/Ethnic		AR	Young	Cleveon
			IL	Azcottia	Carlos
			LA	Doucet	Shirley (P)
			MO	Brewster	Mary "Mikki"
			OK	Jones	Alberta
			OK	Montgomery	Clyde
			WI	Vue	Thai (P)
	Teacher Ed		IL	Anderson	Marcia (P)
			IN	Brown	Betty
			LA	Myers	Lori (P)
			MI	Cory	Ed
			MO	Stewart	Bob (P)
			OK	Osgood	Virginia
			OK	Warren	Joan (P)
			WI	Fedje	Cheryl
4	Admin/Inst	Post	CO	Bradney	Jim
			CO	Plank	Debi
			IA	Dastmozd	Rassoul (P)
			MN	Lee	Barb (P)
			MN	Otto	Mary (P)
			MT	Bates	Leonard (P)
			ND	Darling	Doug (P)
			NE	McGahan	Marilyn (P)
			NM	Sackett	Joe (P)
			SD	Skatvold	Ron (P)
			Wy	Ludwig	Dee
		Sec	CO	Acheson	Suzanne
			CO	Fuller	Don (P)
			CO	Hutchinson	Atman
			KS	Clark-Leiker	Joni
			MN	Wilkosz	Joan (P)
			MT	Jimmerson	Bill (P)
			NE	Wise	Rachel (P)
			SD	Moore	Kristin
			WY	Velle	Lyn (P)
	Bus/Labor/Assoc		CO	Martinez	Dominic (P)
			MT	Judge	Don
			ND	Austad	Alan
			NE	Mullin	Phil
			NM	Langley	Larry (P)
			SD	Sheehan	Cindy (P)
			WY	Gonzales	Alfrieda
	Director Rep	Post	IA	Garey	Jerda (P)
			KS	Peck	Susan
			MN	Allen	Deena
			MN	Jacquart	Mary
			MT	Merdinger	Sandy
			MT	Parisot	Arlene (A)
			ND	Boekes	Wayne
			ND	Overboe	Helen
			NE	Baack	Dennis
			NM	Farley	Stewart (P)
			WY	Snyder	Bruce

BEST COPY AVAILABLE

Region	*Network*	*Post/Sec*	*State*	*LastName*	*FirstName*
4	Director Rep	Sec	CO	Tom	Lorrie
			IA	Foelske	Roger (P)
			KS	Hines-Starr	Merlyne
			MN	Mecklenburg	Jim
			MN	Smith	Daniel
			MN	Strom	Tom
			MT	Messinger	Jody
			ND	Rood	Dan
			NE	Campbell	Richard
			NM	Olix	Robert
			SD	Nelson	Larry (P)
			SD	Smith-Rockhold	Gloria (P)
			WY	Trujillo	Phillip (P)
	Racial/Ethnic		MT	Swaney	Ellen
			CO	Romero	Tony (P)
			IA	Caldwell	Chico
			MN	Higgins	Art
			ND	Derby	John (A)
			NM	Lujan	James (P)
			WY	Medina-Flagg	Dora
	Teacher Ed		CO	Ginsberg	Rick (P)
			IA	Martin	Robert
			KS	Harbstreit	Steven (P)
			MN	Larkin	Alice
			MN	Lee	Barbara
			ND	Melgaard	Dave (P)
			NE	Renzelman	John (P)
			NM	Barrett	Chandler
			SD	Andera	Tim
			WY	Bennett	Rob
5	Admin/Inst	Post	AK	Esposito	Fred (P)
			AZ	Perry	Clyde (P)
			CA	Pelachik	Patty (P)
			HI	Shimabukuro	Bert
			ID	Compton	Chris (P)
			OR	Lammers	Mary Ann (P)
			UT	Cartwright	Donna P
			WA	George	Thomas P
		Sec	AZ	Daley	Doug
			CA	Mitcheltree	Darlene
			HI	O'Leary	Lauren
			HI	Yoshida	Peggy
			ID	Carroll	Miles (P)
			NV	Sethaler	Patricia (P)
			NV	Sethaler	Patricia
			OR	Keller	Ernie
			WA	Knue	Tim (P)
			WA	Wetterauer	Leska (P)
	Bus/Labor/Assoc		AZ	Sma	Sheri
			CA	Powers	Carolyn
			HI	Kyi	Sybil (P)
			ID	Burlage	Bonnie (P)
			OR	Maas	Dennis (P)

Region	*Network*	*Post/Sec*	*State*	*LastName*	*FirstName*
5	Bus/Labor/Assoc		UT	Ayoub	Allan
			WA	Wignall	Janis (P)
	Director Rep	Post	AK	Redman	Wendy
			AZ	Doerr	Judith
			CA	Morrow	Victoria (A)
			HI	Kota	Michael
			ID	Petersen	Dan (P)
			OR	Harpole	Greg
			UT	Maughan	Richard
			UT	Wixom	Gary (P)
			WA	Crabbe	Jim (P)
		Sec	AZ	Bootsma	Helen (P)
			CA	King	Ed
			HI	Moriwake	Rodney (P)
			ID	Rush	Mike
			OR	Noor	Salam
			UT	Brems	Robert
			WA	Fieldman	Rob
	Racial/Ethnic		AK	Tetpon	Bernice
			AZ	Padilla	Laurel (P)
			CA	Shaw	Linda (P)
			HI	Chun	Thomas (P)
			ID	DeLeon	Hector
			OR	Hintsala	Laurain (P)
			WA	Nguyen	Tung (P)
	Teacher Ed		AZ	Rader	Martha (P)
			CA	Pendleton	Ron
			HI	Walton	Frank (P)
			ID	Cassetto	Jim (P)
			NV	McClain	Cliff (P)
			OR	Thompson	Greg
			UT	Thomas	Maurice
			WA	Frey	Judith (P)

The list consists of all participants who have agreed to serve in need sensing networks. The letters after their names indicate if they participated in a conference call during 2001 (P), had an alternate participate for them (A), or sent in comments on the topics discussed by e-mail (E).